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Higher education institutions across the United States are asked to do more with less. This has come at a time when the current presidential administration is calling for the education of every American (White House, 2009). While Americans are enrolling in universities at higher rates than ever before, attrition remains high. Maintaining student enrollment has become a high stakes endeavor as loss of students directly affects institutional budgets. Tinto (1975) posits that student engagement plays an important role in a student's decision to persist or drop out of college. The academic library is poised to play a key role in engaging and retaining students, though not without a disruption to the status quo.

This study seeks to explore factors relating to undergraduate student engagement/ disengagement with the academic library and to explore whether university libraries should expand their role beyond providing academic resources and services into more "real-life" areas that are important to the daily lives of undergraduate students and in support of university retention goals. A quantitative dominant four-phase sequential mixed methods design was implemented at three purposely selected large, public 4-year universities geographically distributed across the United States. Data collection involved 1,291 participants and included semi-structured interviews with academic librarians (n=8), university enrollment and retention officials (n=3), and undergraduate students (n=18), an online survey completed by 1,280 randomly selected undergraduate students,

and an analysis of 50 randomly selected academic library websites. Study findings suggest that there is a viable place in the campus community for the library to serve in an expanded role in support of university student retention goals. Such change, however, may require a realignment of library priorities, rebranding of the library in a new role, and significant marketing. A critical component for the success of a new model relates to building students' perceptions of relevance of the library.

UNDERGRADUATE STUDENTS AND ACADEMIC LIBRARY UTILIZATION: A QUANTITATIVE DOMINANT MIXED METHODS STUDY OF INFORMATION SEEKING NEEDS, PREFERENCES, AND MOTIVATION

by

Rebecca A. Croxton

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Approved by

Dale H. Schunk
Committee Co-Chair

Anthony S. Chow
Committee Co-Chair

To my husband, Paul, and my daughters, Hannah and Natalie.

Your unconditional love, unwavering support, and belief

in me have turned my dreams into possibilities.

APPROVAL PAGE

This dissertation, written by Rebecca A. Croxton, has been approved by the following committee of the Faculty of The Graduate School at The University of North Carolina at Greensboro.

Committee Co-Chair

Dale H. Schunk

Committee Co-Chair

Anthony S. Chow

Committee Members

Clara M. Chu

James M. Eddy

Ye He

_____

Date of Acceptance by Committee

_____

Date of Final Oral Examination

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CHAPTER I

INTRODUCTION

Statement of the Problem

In universities throughout the United States, student retention is a critical issue. The U.S. Department of Education, National Center for Education Statistics (2015) recently reported that 59% of first-time full-time students who began seeking a bachelor's degree at a 4-year institution in fall 2007 completed the degree at that institution by 2013. While institutions of higher education across the country are making concerted efforts to retain their students, a largely untapped resource in support of retention efforts is the university academic library. The academic library is equipped to play a critical role in engaging students in both the formal and informal systems of the institution by bringing together both the academic and everyday life information that students need to thrive and succeed, thus having the potential to positively affect student retention. However, current trends suggest undergraduate students are turning away from their academic libraries in favor of more attractive alternatives for their information seeking (Colón-Aguirre & Fleming-May, 2012; Denison & Montgomery, 2012). In support of university goals for students' academic success and retention, the primary purposes of this study are to develop a deeper understanding of why undergraduate students are turning to sources beyond the academic library to meet their information needs and to explore ways by which to reverse these trends.

Underutilization of Academic Libraries

There is a widening gap between the undergraduate digital information seekers of today and their academic libraries. While academic libraries have long been heralded as the heart of the university (Leupp, 1924), today's undergraduate learners are opting for quick, easy, and more convenient alternatives to meet their information needs that do not include the library (Colón-Aguirre & Fleming-May, 2012; Denison & Montgomery, 2012; Head, 2008; Mizrachi, 2010). Findings from a 2010 large-scale international study on library trends suggest that search engines dominate among college students of all ages as the electronic source used to find online content (93%), while results show a decline in use of library Web sites, electronic journals, and online databases since 2005 (De Rosa, Cantrell, Carlson, Gallagher, Hawk, & Schwartz, 2011, p. 52). These researchers noted that the decline in library usage appears to be driven primarily by college students 25 years of age and older. In this same study, reported usage of library websites (58%), e-journals (39%), and online databases (39%) among the 18-24 year old college student population in 2010 was found to be moderate at best (De Rosa et al., 2011, p. 52).

This turning away from the academic library by undergraduate students elicits cause for concern as significant, positive correlational evidence suggests library utilization is closely related to both students' academic performance (Barkey, 1965; Goodall & Pattern, 2011; Knapp, 1966; Robinson & Schlegl 2004; Wong & Webb, 2011) and university retention (Haddow, 2013; Mezick, 2007, 2015; Soria, Fransen & Nackerud, 2013, 2014). In other words, when students are more engaged with academic resources they are also more likely to achieve academic success and graduate (Haddow,

2013; Mezick, 2015). The concept of student engagement has largely emerged from models of student persistence frameworks such as those proposed by Tinto (1975; 1987) and Bean (1980) which posit that students' engagement in their universities plays a critical role in their commitments to persist in their studies through graduation (Ryan, 2004).

Student Engagement, High Impact Practices, and Academic Libraries

Tinto's *social integration theory,* which has achieved near paradigmatic status, is one of the dominating theories used to understand and explain student retention, and subsequently library engagement, in recent decades (Murray, 2015). In this theory, Tinto (1975, 1987, 1993) posits that students need integration into formal (academic performance) and informal (faculty/staff interactions) academic systems and formal (extracurricular activities) and informal (peer-group) social systems (Rovai, 2003). Tinto's model holds that students' integration into both the formal and informal academic and social systems of the university through academic success, faculty interactions, and social involvement helps to strengthen their academic intentions, goals, and commitment to their institutions, making them more likely to graduate. When integration fails, students are more likely to drop out.

Student engagement has associated high-impact practices, which many colleges and universities have adopted not only in attempt to improve retention rates but also to promote overall student intellectual development (Kuh, O'Donnell, & Reed, 2013). These high impact practices, identified by the Association of American Colleges & Universities

(AAC&U) in their Liberal Education and America's Promise (LEAP) report (Kuh et al., 2013), include:

- First Year Seminars and Experiences
- Learning Communities and Residential Colleges
- Common Intellectual Experiences
- Writing Intensive Courses
- Internships, Capstone Courses
- Undergraduate Research
- Service Learning
- Collaborative Assignments, and
- Diversity/Global Learning

Many academic libraries have begun to shift their focus to creating an atmosphere conducive to both teaching and learning to provide both a formal and informal environment that may foster engagement in these high impact practices (Kuh & Gonyea, 2003, 2015). In a recent study, Murray (2015) examined the perceptions of 271 academic library deans or directors at public comprehensive universities in the United States on the alignment between library services and resources with high impact practices identified by the AAC&U (Kuh et al., 2013). Findings from this study suggest that library deans or directors tend to view library instruction as the element of the library most involved with high impact practices, particularly in first-year seminars, learning communities, writing-intensive courses, and capstone projects. Other efforts by academic libraries relating to these high impact practices include embedding librarians into learning communities as

liaisons, satellite reference, co-curricular programming, providing library liaisons for each university department or program, 24/7 online access to electronic collections of library materials, online research and instruction support, student internships within the library, collaboration with other student support service entities including digital media and student affairs, and provision of space for student collaboration (Crowe et al., 2013).

Among the high impact practices relating to libraries, Sproles, Detmering, and Johnson (2013) noted from their review of 2,052 articles published from 2001 to 2010 on information literacy and library instruction that the prevailing thread running throughout the decade was faculty and librarian collaboration. A second theme noted in this study was the provision of library and information literacy instruction via technology. Other noteworthy trends include proactively embedding librarians within courses to foster information literacy throughout a semester in the user's environment – connecting with what students and researchers do daily (Rudasill, 2010). Finally, one of the most prolific models to promote student engagement with the library is the one-shot instruction session in which students meet with a librarian in a single 50-75 minutes session. Helping students become informationally literate, savvy users who value the library's resources is in direct support of university efforts to engage, integrate, and retain students. The alignment between current university and library efforts in support of student retention and Tinto's (1975) *social integration theory* model is illustrated in Figure 1.

Essentially, students come to their universities with unique contextual and social cognitive factors that may influence their overall integration into a higher education institution. Contextual factors are many and include students' family backgrounds, their

academic skills and abilities, and prior schooling experiences. Students' intentions of what they expect to gain from their higher education experiences (e.g., social, career/job readiness, educational excellence, and independence from parents), their academic and/or career goals, and personal commitment to graduating from a particular institution, along with external commitments such as family obligations or outside employment may further impact students' academic and social integration into a university.

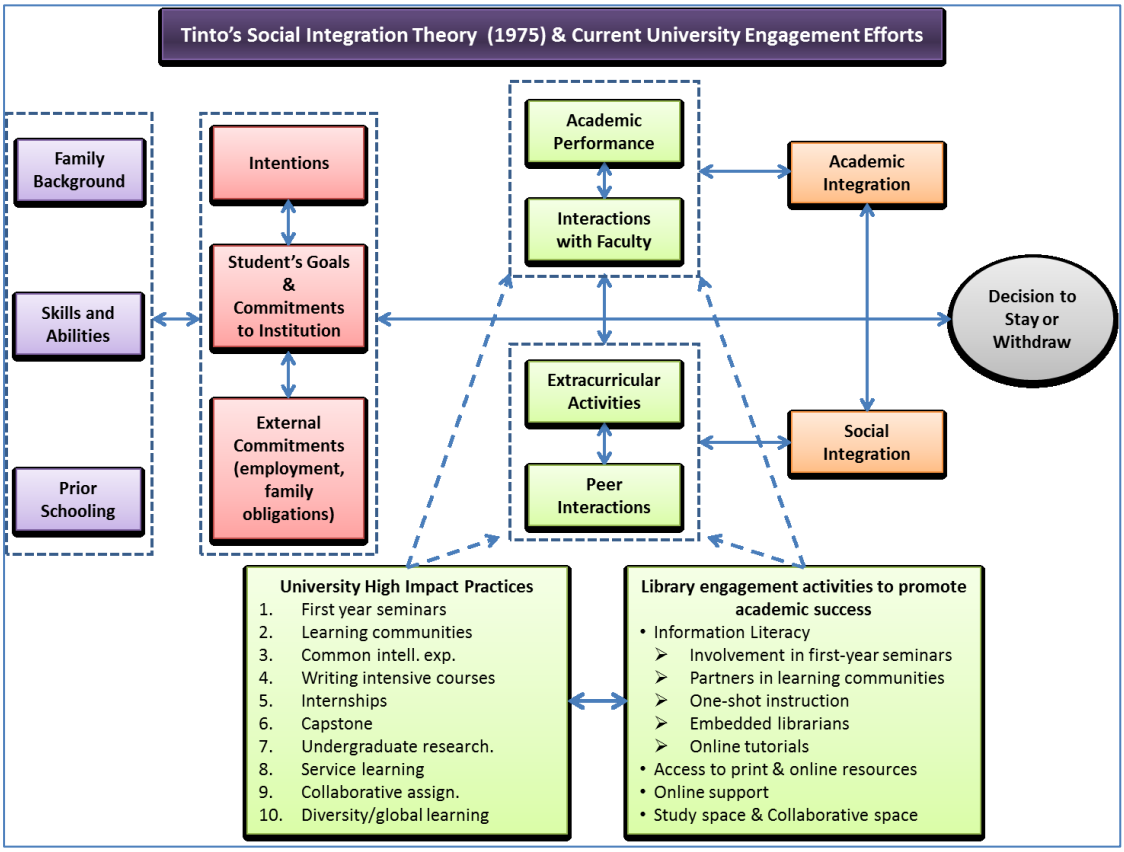

Figure 1. Current Model of Library Utilization in Support of University Retention

Tinto (1975) posits that once students are enrolled in a university, it is critical for them to become both formally and informally integrated into both the academic and social systems of the university through positive academic performance, frequent and meaningful interactions with university staff and faculty, informal social interactions with peers, and involvement in more formal peer interactions such as through extracurricular activities. It is within with this realm of university integration that Tinto suggests students decide if a university is a right fit for them, thereby influencing their decision to stay or withdraw. As illustrated in Figure 1, universities are working to positively affect student integration through their High Impact Practices, including the coordinating efforts on the part of academic libraries, to engage students in support of their academic success and retention through graduation.

Effectiveness of Library Engagement Efforts Lies in Question

Despite efforts on the part of the library to improve information literacy and increase students' willingness to use the library, the efficacy of this work lies in question (Coulter, Clark, & Scamman, 2007; Detlor, Booker, Serenko, & Julien, 2012). Rempel and Cossarini (2013) noted that many students rely on Google for finding materials to support their research, despite the fact that these students have received library instruction that highlighted the value of using library resources to enhance and streamline the research process. In this same study, researchers noted "…lackluster student engagement, difficulty in garnering faculty buy-in and collaboration, an unclear perception of librarian roles, a lack of defined learning outcomes for information literacy, and lack of assessment tools" (Rempel & Cossarini, 2013, p. 51). Lending support to

these findings, Colón-Aguirre & Fleming-May (2012), in their qualitative study with undergraduates, noted that undergraduates do not find library instruction sessions relevant to their practical information needs and many students do not come away from library information sessions feeling fully prepared or willing to move beyond Google and into the library for conducting their information searches. Postulating about reasons why students choose not to engage with library resources, even after receiving library instruction, Walker and Pearce (2014) suggest, "…Engagement cannot be effectively driven by one-shot library instruction alone" (p. 287).

Recognizing that many undergraduates find library resources confusing and difficult to use, many libraries have undertaken usability studies with students and implemented changes to improve student access to online library resources (Denison & Montgomery, 2012; Foster & MacDonald, 2013; Fuller et al., 2009; Wong, Stelmaszewska, Bhimani, Barn, & Barn, 2009). Though librarians continue to work to promote information literacy among their student populations and improve accessibility to their online resources, many undergraduates continue to turn to other, more attractive alternatives such as Google to meet their information needs (Connaway, Prabha, & Dickey, 2006; De Rosa, 2005, 2006).

What may be missing from this equation is an approach that attends not only to the contextual and social cognitive factors that influence students' information seeking behavior, but also the motivational variables that affect students' willingness to engage with academic library resources. In the present study, Taylor's (1991) information use environments framework is used to better understand the context of undergraduate

students by looking at the set of people, settings, social networks, problems that prompt action, and barriers. Social cognitive career theory, proposed by Lent, Brown, and Hackett (1994, 2000), is used to examine the social cognitive career and academic factors that influence students' behavior and information needs. Students' underutilization of library resources and factors that may motivate students to engage with these resources is explored using the expectancy-value theory of motivation proposed by Eccles et al. (1983). Motivation is defined as the "process whereby goal-directed activity is instigated and sustained" (Schunk, Pintrich, & Meece, 2008, p. 4).

While library and information professionals can work to create useful and easy-to-use library systems and teach students how to access these resources, if undergraduates are not motivated to use these systems, then efforts to change will be for naught. To better meet the needs of information seekers and influence their motivation to engage with the library, the information seeker must be placed at the center of the study and research efforts taken to understand who they are by looking at both their contexts as well as the social cognitive factors that influence their information seeking needs and behavior. With an understanding of undergraduate students in context, efforts can then be taken to explore the motivational factors that drive their information seeking behavior and consider ways by which to engage students with their academic libraries. As a profession, we must ask ourselves why things are the way they are, why do we do things the way we do, and challenge ourselves to more effectively meet the needs of our users.

Purpose Statement

The purpose of this study is two-fold: (a) to better understand the factors relating to undergraduate student engagement/disengagement with the academic library (e.g., contextual and social cognitive factors, information needs, preferences, relevance, and motivation) and (b) to explore whether university libraries should expand their role beyond providing academic resources and services into more "real-life" areas that are important to the daily lives of undergraduate students and in support of the university goal of retention. To filter these complex ideas most completely and efficiently, a multi-phase mixed methods approach was utilized in order to identify the reasons that may underlie undergraduate students' underutilization of libraries and the ability of academic libraries to meet these needs. Better understanding of the underlying reasons for this underutilization may bring about ways to increase utilization of academic libraries and better connect students to the information they need in support of academic success and university retention. Mixed research and analysis was utilized for this study as it can allow a more complete picture of an event, process, or situation through the varied perspectives provided by each qualitative and quantitative strand.

Research Questions

Four primary research questions are addressed in this study:

- RQ1: What motivational variables best predict library utilization by undergraduate students?
- RQ2: What are the social cognitive information needs of successful students?
- RQ3: How do undergraduate students prefer to meet their information needs?

- RQ4: To what extent is addressing the everyday life information needs of students a viable option for academic libraries?

Definitions of Significant Terminology

- **Academic Self-Efficacy** - Refers to an individual's confidence that they will be successful in their academic work (Lent, Brown, & Gore, 1997).
- **Attainment Value** (Importance) – Refers to the importance of doing well on a task (Schunk et al., 2008).
- **Cost Belief** – Refers to the perceived negative aspects of engaging in the task, including the amount of effort required for the task and the anticipated emotional state (Schunk et al., 2008).
- **Everyday Life Information Seeking -** Consists of collecting materials for helping to answer information needs that arise during the course of one's daily life (Savolainen, 1995).
- **Expectancies for Success -** People's beliefs about their ability to perform a task successfully and relate to the question, "Can I do this?" Most individuals will not choose to engage in a task in which they expect to fail (Schunk et al., 2008).
- **Information Use Environments** – Framework developed by Taylor (1991) that is used to understand information users as a set of people, settings, social networks, problems that give rise to action, and barriers to information.
- **Intrinsic Interest** (Intrinsic Value) **–** Refers to enjoyment people experience when doing a task, or their subjective interest in the content of a task (Schunk et al., 2008)

- **Motivation -** Process whereby goal-directed activity is instigated and sustained (Schunk et al., 2008).
- **Outcome Expectations** - Refers to the anticipated consequences of persisting and graduating (e.g., a college degree will be useful for getting a well-paying job) (Kahn & Nauta, 2001).
- **Perceived Ease of Use (per the Technology Acceptance Model, Davis, 1989) -** The degree to which a user believes use of the technology will be free from effort
- **Perceived Usefulness (per the Technology Acceptance Model, Davis, 1989)** – The extent to which a user believes that a particular technology will enhance job performance
- **Performance Goals –** Refers to an individual's determination to persist and graduate from his or her university (Kahn & Nauta, 2001)
- **Self-Efficacy –** One's perceived capabilities for learning or performing actions at designated levels (Schunk et al., 2008)
- **Subjective Task Value -** A student's beliefs about the reasons he or she might engage in a task and relates to the question, "Do I want to do this?" (Schunk et al., 2008)
- **Task Value (see Subjective Task Value)**
- **Usability -** The extent to which a product can be used by specified users to achieve specified goals with effectiveness, efficiency, and satisfaction in a specified context of use" (International Organization for Standardization, 2016; Usability.Net, 2006).

- **Utility Value** -Refers to the usefulness of a task for individuals in terms of their future goals, including career goals (Schunk et al., 2008).

CHAPTER II

CONCEPTUAL FRAMEWORK AND LITERATURE REVIEW

In order to develop a conceptual framework by which to design this research study, to understand the current context of undergraduate student information needs and information seeking behavior, to identify where gaps in the literature exist, and to develop the research questions for the present study, a comprehensive review of the extant literature related to student engagement, academic retention, information seeking, library utilization, usability, and motivation was conducted. Based upon the findings of this review, a conceptual framework was developed and used as a guide to frame this study. To explore the concepts outlined in this conceptual framework and to identify the constructs for the present study, the relevant literature was examined to explore undergraduate students' information needs and preferences and their acceptance of and motivation to use library resources.

Conceptual Framework

Tinto's *social integration theory* (1975) was used as the guiding theory for this study as it relates to why and how the identification of and meeting undergraduate students' information needs through academic library engagement may help support university retention goals. The viability of expanding the role of the academic library to holistically meet the *everyday life information seeking* (ELIS) (Savolainen, 1995) needs of undergraduate students in support of retention is one key component of this framework

that was also explored. Overall, the conceptual framework for this study begins by placing undergraduate students in context using Taylor's (1991) *information use environments* model to understand them as a set of people, settings, social networks, problems that give rise to action, and barriers to information. Closely related to contextual factors, social cognitive factors relating to students' information needs and behaviors are examined using *social cognitive career theory*, which brings into consideration students' perceptions of academic ability, academic self-efficacy, outcome expectations, performance goals, person aspects, and the environment (Lent et al., 1994). With an understanding of students' contextual, social, and cognitive factors, Wilson's (1997) *information seeking theory* can then be used to outline how a person moves from having an information need to actively searching for information to satisfy this need using a particular resource. Within this framework, the *expectancy-value theory of motivation* developed by Eccles et al. (1983) and key principles of the *technology acceptance model* (TAM, Davis, 1989) are used to examine students' reasons for selecting particular information resources to meet their needs and to explore ways to instigate and sustain engagement with the library.

The conceptual framework for this study is illustrated in Figure 2 and outlined below. This model posits that in order for academic libraries to be accepted by undergraduates as a means by which to meet their information needs, they must be designed around students' contextual, social, and cognitive needs *and* be perceived to be both useful and easy to use (Davis, 1989). According to the expectancy-value theory of motivation (Eccles et al., 1983), if using the library is perceived to have high task value,

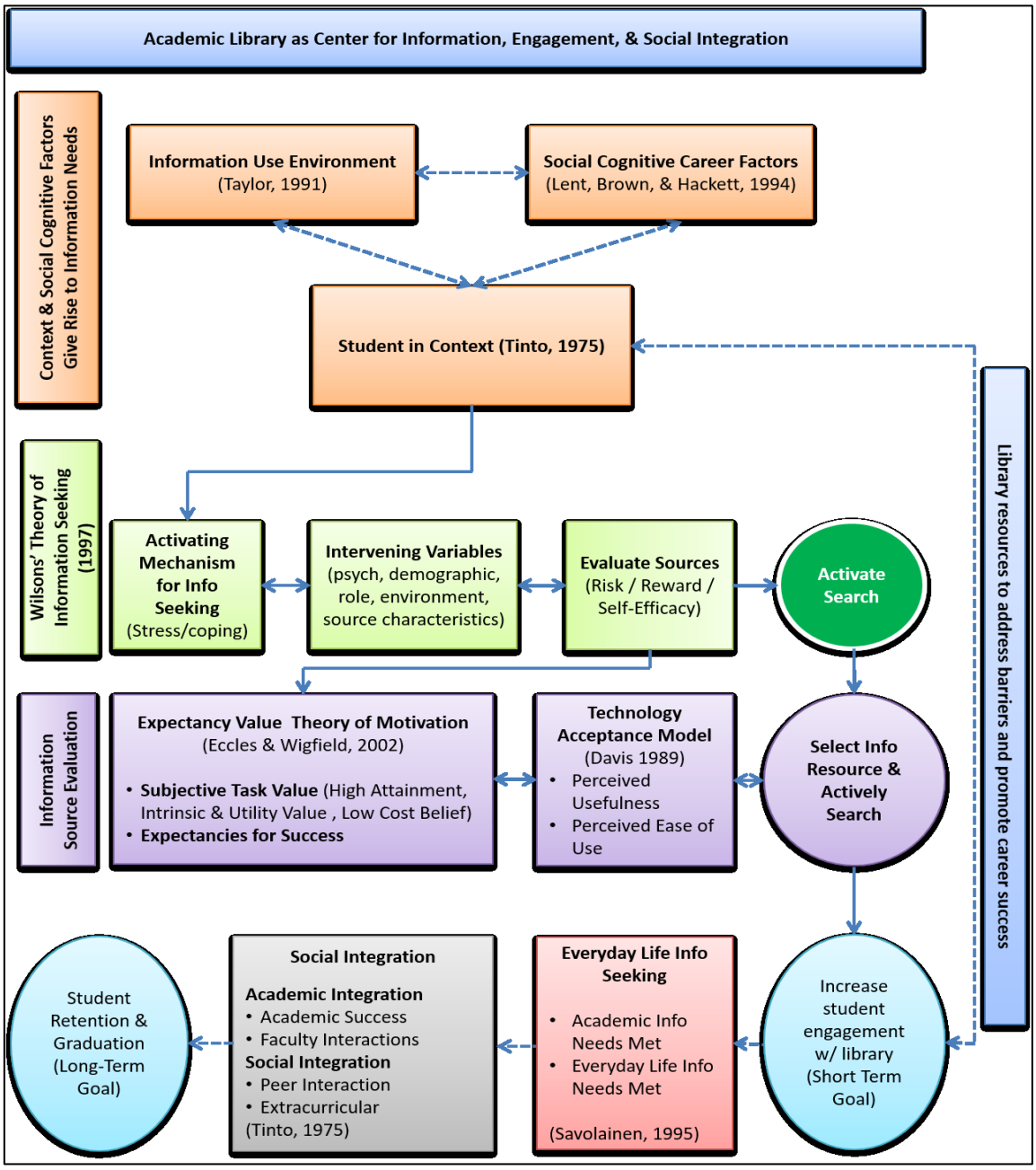

Figure 2. Academic Library as Center for Information, Engagement, and Social Integration

then perceptions of "usefulness" of the library are expected to be high. If students have high expectancies for success in using the library, they are more likely to accept the library as a technology to meet their information needs and activate their information searches using library resources. Value and relevance of library resources are further enhanced by meeting both the academic and everyday life information seeking needs (ELIS) (Savolainen, 1995) of students in support of retention. By holistically meeting the needs of students, they are more likely to become engaged in both the academic and social formal and informal systems of the university in support of integration and retention (Tinto, 1975).

Tinto's Social Integration Theory

Student integration plays an important role in the choice to persist or dropout of an academic environment. As postulated in Tinto's social integration theory (Tinto, 1975; Tinto & Pusser, 2006), students need integration into both the formal and informal academic and social systems of the university. Tinto's model (outlined in the top portion of Figure 1) holds that integrating students into both the formal and informal academic and social systems of the university through academic success, faculty interactions, and social involvement helps to strengthen their academic intentions as well as their goals and commitment to their institutions, making them more likely to graduate. Kuh, Kinzie, Buckley, Bridges, and Hayek (2006) further explain that academic integration represents both satisfactory compliance with explicit norms such as earning passing grades and the values of the institution, while social integration represents the extent to which a student finds the institution's social environment to be congenial with his or her preferences

which are shaped by a student's background, values, and aspirations. Central to Tinto's model of social integration is the interaction between the student and other members of the institution, particularly during the critical first year of college (Tinto & Pusser, 2006). The academic library is equipped to play a critical role in engaging students in both the formal and informal systems of the institution (Tinto, 1975) through an information science approach, thus having the potential to positively affect student retention.

Undergraduate Students in Context

To understand undergraduate students' information seeking needs, preferences, and motivation to seek information, including engagement with academic libraries, these students must first be understood in context. Both Taylor's (1991) information use environments framework and the social cognitive career theory (Lent et al., 1994) are used to develop a holistic understanding of the unique information needs of undergraduate students. These contextual and social cognitive frameworks as they relate to Tinto's social integration theory are outlined in Figure 3 and further discussed below.

First, Taylor's information use environments framework, which "…looks at the user and uses of information and the contexts within which those users make choices about what information is useful to them at particular times" (Taylor, 1991, p. 218), is particularly well suited for this study as it helps to establish a holistic context for understanding undergraduate students' information needs by looking at these students as a set of people, their information seeking settings, social networks, problems prompting action, barriers to information or goal attainment, and problem solutions. Use of this framework to understand people, situations, and problems is well documented in the

library and information seeking literature across a variety of groups (Agada, 1999; Hersberger, Murray, & Sokoloff, 2006; Kazmer, Glueckauf, Ma, & Burnett, 2013; Olatokun & Ajagbe, 2010; Rosenbaum, 1996).

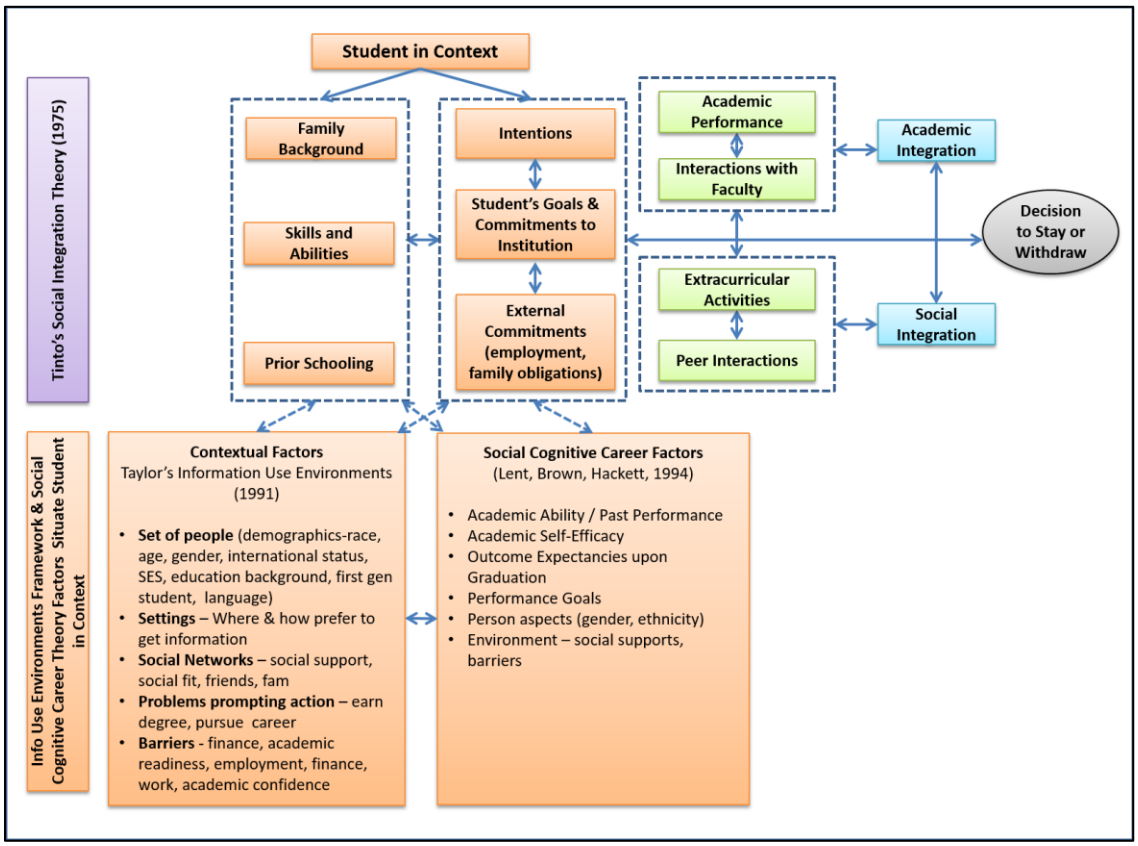

Figure 3. Situating Students in Context

Social cognitive career theory (SCCT), proposed by Lent et al. (1994, 2000), is also useful for helping situate undergraduate students in context as well as understanding their motivation to engage with their academic libraries and their likelihood of persistence at the university. Social cognitive career theory is derived primarily from Bandura's (2001) social cognitive theory which posits that learning and knowledge are

shaped by the interaction a student has with others and the context within which the interactions occur. Building on social cognitive theory, SCCT attempts to explain the "central, dynamic processes and mechanisms by which (a) career and academic interests develop, (b) career-related interests are forged and enacted, and (c) performance outcomes are achieved" (Lent et al., 1994, p. 80). More specifically, SCCT suggests that in addition to students' academic abilities/past performances, persistence is influenced by their confidence in their academic abilities (self-efficacy), anticipated consequences of persisting and graduating (outcome expectations), and the determination to persist and graduate (performance goals) (Kahn & Nauta, 2001). Kahn and Nauta (2001) used social cognitive career theory as their guiding framework to determine significant predictors of college freshman-to-sophomore persistence. Their findings lend support to a body of previous literature that has linked academic ability indices to persistence (Bean, 1980, 1985; Cabrera, Castañeda, Nora, & Hengstler, 1992; Cabrera, Nora, & Castañeda, 1993; Pascarella & Chapman, 1983; Tinto, 1975). Kahn and Nauta (2001) also noted that students' social support and barriers relative to goals related significantly to their academic self-efficacy across a sample of undergraduate students across multiple universities. Together, these findings suggest that both contextual and social cognitive variables may be important factors for understanding undergraduate students' information seeking needs, preferences, behaviors, and utilization of library resources.

Information Seeking Theory

With a holistic understanding of students in context, it is then possible to begin to explore how students prefer to seek information. This requires an understanding of the

underlying theoretical bases for information seeking behavior in order to consider ways by which to tailor information seeking/information retrieval tools to meet these needs. Wilson's information seeking model (1981, 1997) is useful for understanding information seeking behavior as it applies to this research study.

Wilson's (1981, 1997) model of information seeking behavior is drawn from a psychological perspective in which he proposes that basic needs can be defined as physiological, cognitive, or affective. This model presents a macro-level view of information seeking behavior and suggests how information needs arise (stress/coping), what intervening variables play a role in a choice to initiate behavior, and what may prevent or facilitate information searching. The information seeker is situated at the center of this model with the understanding that information needs are contextually specific (Wilson, 1997). Information searching behavior is activated in response to stress/coping in which one's information needs are unmet. Intervening variables play a role in activating search behavior, particularly as they relate to psychological, demographic, role-related or interpersonal, environmental, or source related characteristics. Risk/reward theory and social learning theory/self-efficacy help to explain why some sources of information may be used more than others by a given individual. (This ties in very closely with the expectancy-value theory of motivation (Eccles et. al., 1983) in which it is posited that users are motivated to initiate and sustain an activity task such as information seeking when they expect to succeed (related to self-efficacy) and the value of the reward is high, while cost is low (risk/reward)). Therefore, it is a student's context and social cognitive variables, the stress of having an information need unmet, an

individual's expectancy for success in undertaking search behavior (expectancy), and the risk/reward (value) of these efforts to fulfill a need that activates/initiates information seeking behavior. The initiating factors will determine the degree to which one searches for information, ranging from passive attention (no information seeking intended, but information acquisition occurs), passive searching (one type of search results in acquisition of information that happens to be relevant), active searching (individual actively seeks out information), and ongoing searching (occasional continuation of searching to update understanding) (Choo, Detlor, & Turnbull, 2000). It is the active searching behavior that is applied to this current research study. Based upon this theory, it is critical to reduce the risk of failure for the user when engaging in information retrieval systems, thus improving self-efficacy and expectancies for success, while at the same time making the system high on reward and low on risk (i.e. low cost - useful results that are quick, convenient, and easy to access).

Expectancy-Value Theory of Motivation

Though efforts are widespread to promote information literacy and engage students with library resources, students' motivation to utilize these resources may be a critical component that has been missing from the conversation. Motivation is defined as the "process whereby goal-directed activity is instigated and sustained" (Schunk et al., 2008, p. 4). The expectancy-value model of achievement motivation and behavior, developed by Eccles et al. (1983) is a useful model to explore students' underutilization of library resources and to consider ways to motivate students to engage with these resources. Expectancy-value theories have been popular in the field of education and

learning (e.g. Hodges, 2004) and communication studies (Cooper, Burgoon, & Roter, 2001), though have been seldom used in the study of information seeking behavior (Savolainen, 2012). However, Marchionini (1995) explains that information seeking can be approached as a type of learning, even though the processes are not identical. Learning demands retention while in the case of information seeking, the information may be used for a task at hand.

According to the expectancy-value theory of motivation, "…individuals' expectancies for success and the value they have for succeeding are important determinants of their motivation to perform different achievement tasks and their choices of which tasks to pursue" (Wigfield & Eccles, 2002, p. 91). In other words, while library and information professionals can work to create useful and easy-to-use library systems and teach students how to access these resources, if undergraduates are not motivated to use these systems, then efforts to change will be for naught.

In a recent interview, Wigfield explained,

> According to this theory, the most direct influences on performance and choices are the beliefs individuals have about their ability in different areas and how well they expect to do on them, and the values or incentives different activities hold for individuals (Bembenutty, 2012, p. 2).

This theory, which grew from a social cognitive perspective based in personal, social and developmental psychology, focuses on the role of students' expectancies for academic success and their perceived value for academic tasks (Schunk et al., 2008). This aligns well with the "Evaluate Sources" component of Wilson's information seeking theory (1997) in which risk, reward, and self-efficacy of using an information source is

evaluated by an information seeker. Schunk et al. (2008) explain, "Students may be confident that they can do well and expect to succeed, but if they do not value the task they will be less likely to engage in it" (p. 44). Placing these expectancy-value motivational elements in terms relating to undergraduates' utilization of library resources, though students may (or may not) expect to be able to effectively use academic library resources to meet their information needs, if they perceive other, more familiar alternatives (such as using Google) are convenient, quicker, and easier to use and that the results they obtain when using these alternatives are "good enough," then the library will continue to be underutilized, even when students understand the quality of material that can be obtained by using these library resources (Brophy & Bawden, 2005).

Expectancies.

The two key elements of this theory are expectancies and values. Expectancies and values are largely impacted by students' social environment, cognitive perceptions about their abilities based on their self-schema (self-concept about oneself), success/failure in past experiences, expectations of the difficulty of a task, affective memories of these experiences, and short and long-term goals. **Expectancies** are people's beliefs about their ability to perform a task successfully and relate to the question, "Can I do this?" Most individuals will not choose to engage in a task in which they expect to fail (Schunk et al., 2008). Findings presented in the library and information studies literature suggest undergraduate information seekers experience high failure rates in their library information seeking (Foster & MacDonald, 2013; Fuller et al., 2009). Therefore, it seems essential that libraries and academic faculty continue to collaborate to ensure

undergraduate students are informationally literate and know how to utilize library resources in order to improve their expectancies for success. Complementary to expectancies for success is a **task's subjective value**, which refers to a student's beliefs about the reasons he or she might engage in a task and relates to the question, "Do I want to do this?" (Schunk et al., 2008). In terms of library engagement, if undergraduate students place greater value in search engines to meet their information needs, the utility of digital library resources and students' willingness to use these resources becomes tenuous.

Subjective task value.

Task values are a crucial part of the model because they affect individuals' choices (Eccles et al., 1983; Wigfield & Eccles, 1992). Eccles and Wigfield (1995) defined four components of task value, which include **attainment value**, **intrinsic value**, **utility value**, and **cost belief**. Schunk et al. (2008) further help to operationalize these components:

1. **Attainment value (or importance)** refers to the importance of doing well on a task.
2. **Intrinsic interest or intrinsic value** refers to enjoyment people experience when doing a task, or their subjective interest in the content of a task.
3. **Utility value** refers to the usefulness of the task for individuals in terms of their future goals, including career goals.

4. **Cost belief** refers to the perceived negative aspects of engaging in the task, including the amount of effort required for the task and the anticipated emotional state.

Because each student comes to the university with a unique set of beliefs based upon his or her social world, cultural milieu, past experiences, self-schema, and differing long-term and short-term goals, it is difficult to suggest what one student may value compared to another. For example, one student may be intrinsically motivated to use library resources for research because it is enjoyable (**intrinsic value**), while another may feel that doing so will take too much time away from other activities (**cost belief**) such as working on other assignments, socializing with friends, or working at one's place of employment. At the same time, a student may use library resources because doing so is required by the professor in order to obtain a good grade (**attainment value**) and getting good grades is critical for gaining acceptance into a particular undergraduate degree program (e.g., pre-service teacher education), graduate school, or getting a desired job (**utility value**).

Technology Acceptance Model

Aligning closely with the expectancy-value theory of motivation, the Technology Acceptance Model (TAM) (Davis, 1989) is a useful model by which to explore factors relating to acceptance of academic library resources by undergraduates as a relevant resource for them to meet their academic and everyday life needs. The TAM is a well-accepted model of user acceptance of new information technologies. According to the TAM, *perceived usefulness* and *ease of use* are the overall determinants of acceptance

and usage of a new technology. Perceived usefulness is the extent to which a user believes that a particular technology will enhance job performance. Perceived ease of use is the degree to which a user believes use of the technology will be free from effort. Ease of use of digital library systems is explored in this study through the principles of usability, particularly as they relate to efficiency, effectiveness, and satisfaction. Perceived usefulness in the present study is examined through the lens of motivation.

For websites and online tools, usability is critical. If a site is found to be difficult to use, does not easily convey its purpose to convey value, if navigation is confusing, or if it doesn't meet a site visitor's needs, they will leave and pursue other, more convenient methods by which to meet their information needs. Usability, according to the International Organization for Standardization – standard 9241 is, "The extent to which a product can be used by specified users to achieve specified goals with effectiveness, efficiency, and satisfaction in a specified context of use" (Usability.Net, 2006). In laymen's terms, Nielsen (2012) defines usability as "a quality attribute that assesses how easy user interfaces are to use." Key components of usability (Nielsen, 2012) include:

1. Learnability (How easy is it to accomplish tasks on the first visit?)
2. Efficiency (How quickly can users perform tasks?)
3. Memorability (How easily can users reestablish proficiency when returning to a site after a period of not using it?)
4. Errors (How many errors do users make, how severe are the errors, and how easily can they recover from the errors?)
5. Satisfaction (How pleasant is it to use?)

Findings in the literature suggest many undergraduate students find their library websites to have poor usability (Denison & Montgomery, 2012; Foster & MacDonald, 2013; Fuller et al., 2009; Wong et al., 2009). Usability must be a developmental keystone of a successful library experience, for if users cannot access information easily, there is little point in expending the time, effort, and expense it takes to provide digital services (Dee & Allen, 2006). Chow (2012) explains that taking a human centered design approach that emphasizes pervasive usability with representative users will help ensure the digital environment is high on utility and ease of use. Analyses of the usability of digital library services must reach beyond the actual interface design of the tools and consider what factors make websites effective, efficient, and satisfying for users. Chow (2012) further explains that designers frequently develop digital information spaces using their own paradigms, thereby creating a gap between the designer and the user.

To properly serve the diverse information needs of the undergraduate student population, it is important to gain an understanding of the unique characteristics and needs of students by taking a user-centered design approach. User-centered design is the process of designing a tool from the perspective of how it will be understood and used by the user (Nielsen & Loranger, 2006; Usability First, n.d.). Taylor (1991), in his discussion of a model of information use environments, explains that information choices are impacted by who are the users, their settings, social networks, problems that lead to their information needs, and barriers (including situational, institutional, dispositional, and academic skills). Designing online library tools that address students' academic and everyday life needs increases the likelihood that they will be perceived to be useful,

efficient, satisfying, and user friendly for the user/learner, thus increasing expectancies for success in using these library resources. According to the principles of the expectancy-value theory of motivation (Eccles et al., 1983), this will help to build value for users as they find that it efficiently and effectively meets their information needs at a low cost.

Everyday Life Information Seeking

The everyday life information seeking needs of undergraduate students are included as part of this conceptual framework in order to explore whether academic libraries should extend their efforts beyond the academic and shift towards holistically meeting the information needs of undergraduate students in support of student retention. Savolainen (1995) first defined the research field of everyday life information seeking (ELIS) research. Applying Bourdieu's (1984) concept of habitus as a way to conceptualize information seeking as a natural component of everyday practices, Savolainen (1995) developed the ELIS framework for understanding information seeking behavior in work and at home. Savolainen (1995) broadly defined the concept of ELIS as that which, "…refers to the acquisition of various informational (both cognitive and expressive) elements which people employ to orient themselves in daily life or to solve problems not directly connected with the performance of occupational tasks" (pp. 266-267). These everyday life information needs are those that are not necessarily associated with daily work or activities occurring in the work or school environment. In this model, Savolainen (1995) posited that work-related (e.g., academic) and everyday life information needs should be treated as overlapping and complementary rather than being

treated as dichotomous. Returning to Tinto's (1975*) social integration theory,* academic libraries have the opportunity to play an important role in retaining students by providing bringing together both academic *and* everyday life information resources that can serve to engage students into both the formal and informal academic and social systems of the university.

Summary: Conceptual Framework

The theories and concepts presented above relating to the information use environments (Taylor, 1991), social cognitive career theory factors (Lent et al., 1994), information seeking theory (Wilson, 1997), expectancy-value theory of motivation (Eccles & Wigfield, 2002), the technology acceptance model (Davis, 1989), and principles of user-centered design and usability all interplay to help the researcher understand user behavior and explore ways by which to instigate and sustain library engagement. Relating these concepts to information seeking, when a user experiences stress or a need to cope, a mechanism is activated by which they recognize they have an information need. The willingness of a person to address this need is influenced by his or her background and social cognitive factors. The decision to actively engage in information seeking is further influenced by the perceived risk and reward of doing so. When the risk/reward ratio is acceptable to an information seeker, search behavior will be activated. An information seeker may be motivated to use a particular technology or online resource (e.g. website, library, etc.) when it is perceived to be both useful (high task value) and easy to use (low cost), thus building an expectancy for success. Information seekers will be motivated to sustain their activity on a site when they feel the

"information scent" is strong enough that they are confident they will find what they need (Pirolli, 2007). If the costs (e.g. takes too much time or effort, is frustrating) of using a site outweigh the benefits, they will leave the site. Thus, while perceptions of ease of use and utility will influence a person's choice to adopt a technology according to the TAM, their willingness to sustain their behavior (use of a site or tool) is dependent upon actual experiences as they relate to their expectancies for success and subjective task value.

According the conceptual framework outlined in Figure 2, when students are able to easily access information available online via their academic libraries that is both valued and relevant for meeting both their scholarly and everyday life information needs, there is a greater likelihood that these individuals will be motivated to engage with these resources. Returning to Tinto's (1975) social integration theory, academic libraries have the opportunity to play a key role in retaining students by bringing together information and resources that can serve to engage students in both the formal and informal academic and social systems of the university in support of university retention.

Literature Review

A comprehensive review of the literature was conducted to further explore the concepts outlined in the conceptual framework and to develop a deeper understanding of the factors relating to undergraduate student engagement/disengagement with the academic library and to explore whether university libraries should expand their role beyond providing academic resources and services into more "real-life" areas that are important to the daily lives of undergraduate students and in support of the university goal of retention. This review further allowed the researcher to identify gaps in the

literature as well as to determine the constructs and research questions for the study. To this end, this literature review is organized into four overarching categories: (1) Information Needs of Undergraduates, (2) Information Seeking Preferences of Undergraduates, (3) Undergraduates' Information Needs, Preferences, and the Technology Acceptance Model, and (4) Gaps in the Literature.

Information Needs of Undergraduate Students

The information needs of undergraduates are defined by both the university and the students themselves. Often information needs of undergraduate students are defined by their professors who require them to use scholarly resources available through their academic libraries to meet assignment requirements and receive favorable grades. At the same time, students' academic and everyday life information needs are many and are often met via sources that do not include the library.

Formal information needs.

Numerous studies have shown that academic success is positively correlated with library usage (Goodall & Pattern, 2011; Hiscock, 1986; Soria et al., 2013, 2014; Wong & Webb, 2011). In an early study looking at library usage and academic achievement, Hiscock (1986) examined students' use of the academic library catalog and reference materials and found that catalog usage was positively correlated with students' academic performance. More recently, in an analysis of library usage patterns and achievement of students enrolled in approximately 200 courses at a single university, Goodall and Pattern (2011) noted that library usage varied between academic schools and there were often pedagogic reasons for low usage (defined by the researchers as less than five visits to the

library or borrowing books less than five books, or logging into university's electronic resource collection less than five times). The researchers did note that in some subjects, students who "read" more, measured in terms of borrowing books and accessing electronic resources, achieved better grades (Goodall & Pattern, 2011).

Similarly, Wong and Webb (2011), in a study of 8,701 library records and GPAs of individuals who recently (2007 to 2009) completed their degrees, noted that 31 of the 48 total sample groups (65%) had statistically significant, positive correlations between GPA and check-outs of library materials. Finally, Soria et al. (2013, 2014) examined the relationship between student academic achievement (GPA) and library usage among first-year non-transfer students (N=5,162) at a public, research intensive university in the United States as documented through 10 collection points (e.g., online databases, electronic books, electronic journal logins, library website logins, loans, interlibrary loans, library workstation logins, usage, and engagement with library staff through instruction sessions or reference interactions). Among the first year class, 71.3% (n=3,818) had used at least one library service, while 28.7% did not use any library services. The findings of this study suggest statistically significant differences exist between the cumulative GPAs of first year students who used at least one library service (mean GPA=3.18) compared with the average GPA of students who did not use the library (mean GPA=2.98), holding constant the other predictor variables in the model. In this same study, ordinary least squares regression analyses were conducted to predict students' GPA by the total frequency of their use of the 10 different types of library services and was found to be statistically significant. The results of this study suggest

four types of library services were positively and significantly associated with students' cumulative GPA: database logins, book loans/renewals, electronic journal logins, and use of library workstations (Soria et al., 2013, 2014).

Though research data suggest that student achievement is positively correlated with usage of academic libraries (Goodall & Pattern, 2011; Hiscock, 1986; Soria et al., 2013, 2014; Wong & Webb, 2011), findings from other studies suggest students are largely extrinsically motivated and turn to their academic libraries only when required to do so by their professors to earn a passing grade (Colón-Aguirre & Fleming-May, 2012; Davis & Cohen, 2001; Robinson & Schlegl, 2004). In a qualitative study in which 21 undergraduates were interviewed about their information seeking for course-related research, Colón-Aguirre and Fleming-May (2012) noted that the majority of respondents reported their main reason for using library resources was that the course instructor either requested that they do so or required that students include a list of references as proof of having used library resources. In this same study, when there was no instructor imposed restriction on the type of information required, most students said they browsed for information using an online search engine.

Likewise, in a review of the bibliographies of 67 term papers prepared by Cornell University undergraduates, Davis and Cohen (2001) noted a tendency for undergraduates to use non-scholarly online resources unless provided with "clear and enforceable guidelines" by a professor or instructor. Taking this line of research further, Robinson and Schlegl (2004) conducted a comparison study of the quality of resources selected by undergraduates for research papers between a control group, a class that received library

instruction and encouragement to use scholarly resources, and a class that received library instruction and enforceable guidelines for using scholarly resources. Study findings suggest that instruction and encouragement had very little effect on the quality of student research, but instruction-and-penalty had a statistically significant, positive effect on the number of scholarly sources cited (Robinson & Schlegl, 2004).

Taken together, findings from these studies suggest that while academic success has been found to be positively correlated with library usage (Goodall & Pattern, 2011; Hiscock, 1986; Soria et al., 2013, 2014; Wong & Webb, 2011), the driving force for undergraduate library usage largely stems from students' extrinsic motivation to achieve favorable grades on course assignments due to instructor imposed guidelines (Colón-Aguirre & Fleming-May, 2012; Davis & Cohen, 2001; Robinson & Schlegl, 2004). In other words, while academic library resources are available to meet the formal information needs of undergraduates, students largely utilize these resources only when extrinsically motivated and "feel they must."

Informal information needs.

Findings from recent studies suggest lack of preparation for higher education study, academic issues, feelings of isolation and /or not fitting in, and concerns about future aspirations are the primary reasons students report for dropping out of higher education study (Murtaugh, 2012; Stoessel, Ihme, Barbarino, Fisseler, & Stürtmer, 2015; Thomas, 2012). Closely related to the above noted factors, findings from numerous studies suggest that even persons with well-developed career paths will be unlikely to pursue that path if they perceive substantial barriers to achieving their goals (Brown &

Lent, 1996; Luzzo & McWhirter, 2001; Raque-Bodgan, Klingaman, Martin, & Lucas, 2013) including, but not limited to parental support, financial worries, others' perceptions related to gender and ethnicity, academic readiness and study skills, social "fitting in," and outside concerns such as employment and childcare. It is worthwhile to explore whether educational barriers and reasons cited for dropping out of university study have associated information needs that may be addressed via the academic library. There is no such study noted by this researcher in either the library and information studies *or* academic retention literature that has specifically addressed this intersection between academic barriers, information needs, and university retention from an information science perspective.

The common reasons cited for dropping out of higher education study closely align with Savolainen's (1995) everyday life information seeking (ELIS) model in which he suggests that everyday life and work-related (e.g., academic) information needs are overlapping and complementary. The informal, *everyday life*, information needs of undergraduate students have been scarcely addressed in the LIS scholarly literature regarding academic libraries. Among the few studies available, research findings by Croxton (2015), Head and Eisenberg (2011), and Given (2002) lend support to Savolainen's (1995) ELIS model, noting that students' reported academic/course related assignments, health and wellness, purchasing a product or service, work/career information, and news/current events are the most commonly cited information needs among undergraduate students.

Affirming this concept of interconnectivity between everyday life and work-related information needs, Given (2002), in a qualitative interview study involving 25 mature undergraduates (age 25 and above), noted that once enrolled in college, the interviewee's needs, though primarily focused on academic work (e.g., locating course readings), also sought information for everyday concerns that arose out of their engagement with the university. Given (2002) further explains,

> The intellectual work involved in university study seeps into all students' everyday lives; the time-budgeting required to meet deadlines demand evening and weekend hours, and students must work everyday and academic information–seeking into these tight schedules (p. 28).

More recently, Head and Eisenberg (2011) conducted a study of both course related and everyday life information seeking behavior of college students on 25 U.S. campuses (2008 through 2010) as part of Project Information Literacy, a large-scale study of college students and their research habits. Data collection included a survey of 8,353 college students, focus groups conducted on 11 campuses with 86 participants, and follow-up interviews with 25 students. Overall, the results suggest that participants were "more caught up" and "more engaged" in everyday life research than with course related research (Head & Eisenberg, 2011). A large majority of the sample (79%) reported looking for news, information about a product or service (74%), and/or health and wellness topics (74%). Other everyday life information needs reported from the survey included searching for information about work/career (67%), travel (61%), social contacts (51%), domestic life (e.g., housing) (45%), work questions (36%), advocacy

(32%), spiritual (24%), and search for experts (e.g., medical doctor) (20%). Student participants reported using a variety of sources to satisfy their everyday life information needs, including search engines (95%), friends/family (87%), Wikipedia (84%), classmates (81%), personal collection (75%), social networks (70%), government sites (63%), instructors (53%), research databases (40%), blogs (37%), encyclopedias (37%) library shelves (28%), and librarians (14%). Finally, results from the survey component of this study suggest participants struggled most with sorting through all they had found; filtering relevant from non-relevant results (41%) was more difficult than anything else. Taken together, the results from this study suggest that academic libraries, while they do not typically play a major role in undergraduates' everyday life information seeking at this time, hold great potential in holistically meeting the needs of undergraduates by serving as a vetted source for information.

In a qualitative study about the information seeking needs of urban teens (age 14-17), Agosto and Hughes-Hassell (2005, 2006a, 2006b) noted that participants rarely thought of libraries as places where their everyday life information needs can be met. While the teenagers in this study identified schoolwork as their primary everyday life information need, they reported that they do not use libraries or books (Agosto & Hughes-Hassell, 2005). What is of particular interest as it relates to the information needs of undergraduates is the empirical model that Agosto and Hughes-Hassell (2005, 2006b) developed from their analysis of their data. Building off the 11 developmental tasks of adolescent development originally identified by Havighurst (1972), the researchers added 12 additional tasks to the model. The 23 developmental tasks were then collapsed into

seven variables that ELIS behaviors serve to support, including: (1) social self (friends/peer/romantic relationships, social activities, popular culture, fashion, social/legal norms), (2) emotional self (family, emotional safety, religion), (3) reflective self (self-image, philosophical concerns, heritage/cultural identity, civic duty, college, career, self-actualization), (4) physical self (daily life routine, physical safety, goods and services, health, job responsibilities), (5) creative self (creative performance, creative consumption), (6) cognitive self (academics, school culture, current events), and (7) sexual self (sexual safety, sexual identity) (Agosto & Hughes-Hassell, 2006b). Further, findings from this study suggest participants largely rely upon easily accessible, familiar sources and channels to meet their information needs (Agosto & Hughes-Hassell, 2005). As academic libraries consider ways by which to become more relevant (*perceived usefulness* per the TAM model, Davis, 1989) to their undergraduate student population and help to engage students into both the formal and informal academic and social systems of their academic institutions, they may consider holistically addressing the information needs of their students including, but not limited to, their scholarly needs.

In addition to the ELIS needs outlined by Given (2002), Agosto and Hughes-Hassell (2005, 2006a, 2006b), and Head and Eisenberg (2011), numerous other studies have identified everyday life information needs of subsets of undergraduate populations that may be met through service entities on campus beyond the library, but are largely untapped (Kitzrow, 2003; Mupinga, Nora, & Yaw, 2006; Schaller, 2011; Sin & Kim, 2013). In a comprehensive literature review of the mental health needs of today's college students, Kitzrow (2003) noted that while the literature suggested students are more

likely to stay in school when their mental health related information needs are met, students themselves are often not aware of the mental health resources available on campus or may be reluctant to use them.

Similarly, online students are a vulnerable population with regard to student retention, with rates of online course dropout ranging from as low as 10% to as high as 50 to 75% (Carr, 2000; Jun, 2005; Rochester & Pradel, 2008). In a study conducted to examine the learning styles, expectations, and needs of undergraduate online students, Mupinga et al. (2006) noted that the top four needs of online students were technical help, flexible and understanding course instructors, advanced course information, and sample assignments. In particular, 93% (n=131) expressed a real need for technical help with computers, logging onto the university network, and navigating through the course management platform (Mupinga et al., 2006). Similarly, Chow and Croxton (2013) conducted a survey study of online graduate students (N=50) with respect to their needs as online learners. On a 7 point Likert-type scale, participants valued a technology help desk (M=5.7), followed closely by a high level of student support services (M=5.5) (e.g. academic advisor, real-time chat, etc.) and faculty virtual office hours (M=5.4).

In an in-depth focus group and survey study (N=8) of the information needs of lesbian, gay, bisexual, transgender, and queer (LGBTQ) college students, Schaller (2011) noted that this subset of undergraduates has unique information needs relating to their sexuality. The information needs identified by study participants included material relating to social, political, and legal marginalization, matters relating to LGBTQ and religion, coming out to family and friends, coping with LGBTQ-based discrimination,

dating, activism, and social gatherings. While the university site in Schaller's (2011) study has a Safe Zone campus group and corresponding website to support gay, lesbian, bisexual, transgender, queer/questioning, intersex, and asexual individuals, none of the participants had ever seen the resources and links hosted on Safe Zone website. Further, based on analysis of the study data, Schaller (2011) noted that the anxiety of possible disclosure in addition to general library anxiety can turn into barriers for LGBTQ individuals. These findings suggest the academic library website may prove to be a useful resource by which to provide carefully vetted information to LGBTQ students in a safe and anonymous platform.

Finally, Sin and Kim (2013) explored international students' everyday life information seeking and the informational value of social networking sites (SNS) by conducting a survey study of 180 international graduate (68%) and undergraduate (32%) students at a large American university. In rank order of importance, the top five everyday life information needs noted by participants included finance, health, news of one's home country, housing, and entertainment. It is interesting to note that 97% of the participants used social networking sites to meet their ELIS needs (apart from social networking as a way of connecting with others). With a maximum score of 5 (*used very frequently*), the mean use of SNS to satisfy ELIS needs was 3.93 (SD=1.13). In this same study, the mean for using web search engines for ELIS was 4.57 (SD=0.74). Like the student subgroups noted in the studies discussed above, international students have many unique information needs that extend beyond their academic, course-related needs. While Sin and Kim (2013) did not suggest that these needs go largely unmet, academic libraries

can serve as an information resource for this student population that brings together credible information that has been vetted by librarians and information about campus services that may be particularly useful to international students, but often go largely unused.

The research studies noted above suggest that both the formal (academic, course-related) and the informal, "everyday life information seeking" needs of students are essential for the overall well-being and success of undergraduate students. While academic libraries have historically focused upon providing access to highly credible resources to meet students' academic/scholarly information needs, there remains a largely untapped realm of possibilities for academic libraries to also serve as information and engagement centers that can provide access to resources and services beyond scholarly resources, thereby holistically serving to meet the needs of the whole individual. Returning to Tinto's (1975) social integration theory, academic libraries have the opportunity to play a significant role in retaining students by bringing together information and resources that will help engage students into both the formal and informal academic and social systems of the university.

Information Seeking Preferences of Undergraduate Students

Historically, because scholarly information resources were scarce, students and academic scholars focused largely upon accessing resources needed to produce scholarly work through their academic libraries (Connaway, Radford, Dickey, De Angelis Williams, & Confer, 2008). However, with the ubiquity of information available on the Internet, academic information seekers', particularly undergraduates', attention to library

resources is becoming scare (Connaway et al., 2006; Connaway et al., 2008; De Rosa, 2006; Prabha, Connaway, & Dickey, 2006). Today's undergraduates, largely between the ages of 18-24 (NCES, 2014), have been found to largely satisfy their research and information needs via Google with resources that are often considered less credible and reliable than may be available through the academic libraries (De Rosa, 2006; Prabha et al., 2006; Wong et al., 2009). Additionally, findings from numerous studies suggest undergraduates value speed, convenience, and ease of use (Connaway et al., 2006; CURL & Research Information Network, 2007; De Rosa, 2006) of information systems, with "convenience" as the most important factor in choosing among information sources (Radford & Connaway, 2008).

Convenience is a priority for undergraduates.

Today's information seekers are largely turning to the web and using search engines that are freely available (e.g., Google) to satisfy their information needs. De Rosa (2005), in a survey study of 3,348 "information consumers" which included both academic and general public information seekers, found search engines to be the primary source to begin an information search. In this study, De Rosa (2005) found that 84% of all users indicated that they began an information search with a search engine, while only 1% indicated they began their search on a library website. De Rosa (2005) further reported that 90% of the respondents were "very satisfied" or "satisfied" with their most recent searches for information using a search engine and respondents overall tended to trust the results from a search engine "about the same" as results from libraries. In this study, search engines were rated higher than libraries by respondents on five performance

attributes: *reliability, cost effectiveness, ease of use, convenience* and *speed.* More specifically, 85% of respondents indicated search engines are best described by the attribute *ease of use*, 89% indicated search engines are best described by the attribute *convenient,* and 92% indicated search engines are best described by the attribute *fast (*De Rosa, 2006).

Using a subset of the data set discussed above, De Rosa (2006) highlighted and contrasted the views of 396 college students (from the U.S., U.K., Canada, Australia, Singapore, and India) and 691 U.S. 14-17 year olds, all of whom responded to the original survey. Similar to the findings from the larger 2005 study, De Rosa (2006) noted that 89% of all college student respondents reported that using search engines for an information search is their first choice, compared to 2% who said they begin an information search with a library website. Overall, 93% of student respondents stated that they were "very satisfied" or "satisfied" with their most recent search for information using a search engine, while 84% said they were satisfied with their most recent interaction with a librarian for an information search. Findings from De Rosa's two studies (2005, 2006) suggest information seekers may not be particularly motivated to access digital library resources, as the results they obtain from using search engines are perceived to be "just as good" as what could be obtained via the library, thereby satisficing their information needs. Considering that participants perceived search engines to be easier, more convenient, and quicker than using library resources, the return on investment of time and energy by using search engines may be higher than when using library resources.

Similar findings were noted in a four-phase study in which researchers explored how undergraduate and graduate students and faculty get their information for personal and academic or professional purposes. In this large-scale study, researchers conducted online surveys and telephone interviews (n=307), focus group interviews (n=78), and semi-structured interviews (n=15) (Connaway et al., 2006; Dervin, Reinhard, Kerr, Song, & Shen, 2006; Prabha et al., 2006). Key findings from this study suggest participants made rational decisions, which are contextually based, as they carried out their information searches, choosing a strategy and level of effort based on situational needs and differentiating between quick and thorough searches (Connaway et al., 2006; Prabha et al., 2006). While participants acknowledged the value of library databases and other online sources, some users did not understand what resources were actually available in libraries nor could they distinguish between databases held by a library and sources merely available online (Connaway et al., 2006). All types of participants in this study noted that library online catalogs are difficult to use (Connaway et al., 2006). Overall, study findings suggest information seekers value familiarity, convenience, currency, and authority in their information searches and, regardless of academic demographics, demonstrate a "heavy reliance on Google and other web information sources" (Connaway et al., 2006, pp. 10-11). One element that sets the findings from this study apart from the De Rosa (2006) study is the contextuality of information search strategies and confusion about and difficulties using library resources. While information seekers may heavily rely upon Google to meet their needs, their level of effort and search strategies may be

dependent upon the situation (Connaway et al., 2006; He, Wu, Yue, Fu, & Vo, 2012; Prabha et al., 2006).

Like Connaway et al. (2006), Dervin et al. (2006), and Prabha et al. (2006), Wong et al. (2009), noted that situational contextuality influenced information seeking behaviors of undergraduates, postgraduates, and expert researchers. In a two-stage study exploring user behavior in resource discovery, Wong et al. (2009) conducted focus group interviews (n=9) and user observations (n=34) . The researchers observed that search strategies changed by context during the course of the research process. They noted,

> When using freely available Internet resources, Google is top of the list, followed by Google Scholar, Wikipedia, and YouTube. Participants' decisions about which resources to use were based on their prior knowledge and experience with a resource and a belief that resources provided by Google and Google Scholar are reliable and relevant most of all always return a list of results. On the other hand, library resources were perceived as credible, providing quality material from a broad subject coverage (Wong et al., 2009, p. 7).

In this same study, Wong et al. (2009) identified several difficulties users encountered when using library resources, including confusion and frustration with navigating library database interfaces, finding full text items from library databases, and finding appropriate resources via the library website to fulfill their information needs. Altogether, the findings of this study suggest that while academic information seekers change their search strategies according to the needs of the situation, preference lies with information that is largely available through Google searches, particularly when digital library resources are perceived as difficult to use.

Bringing together findings from the four-phase study noted above (Connaway et al., 2006; Dervin et al., 2006; Prabha et al., 2006) and results from a study about the needs, behaviors, and preferences of users, non-users, and librarians regarding virtual reference services (Radford & Connaway, 2008), Connaway, Dickey, and Radford (2011) conducted a more focused evaluation of the two data sets for evidence of convenience related findings. Findings from this study of combined datasets identified "convenience" as central to information seeking behaviors. The centrality of convenience is especially prevalent among the millennial subjects [born between 1982 and early 2000s) (Howe & Strauss, 2000)] in both studies, but is true across all demographic categories—age, gender, academic role, and user or non-user of VRS [virtual reference services]" (Connaway et al., 2011, p. 186).

Lending further support to these findings, Connaway and Dickey (2010), in a review of 12 large-scale user behavior studies in the United States and United Kingdom, noted that convenience permeated as a significant factor that influenced information seeking behavior. In this study, convenience included choice of source, ease of access and use, and time. Offering further credence to these findings, Brophy and Bawden (2005), in a case study in which college students were asked to retrieve documents using the Internet or library resources that corresponded to four academic course-related scenarios, noted that while Google was superior for coverage and accessibility, library systems were superior for quality of results. Brophy and Bawden (2005) noted that accessibility was found to be favored by participants over quality as a determinate of choice by the student users. Lack of comprehensiveness in retrieval was not found to be a

strong motivator to use any retrieval system in addition to an Internet search engine for study participants, nor was the prospect of undertaking extra training to make better use of library databases (Brophy & Bawden, 2005). The findings from these studies (Brophy & Bawden, 2005; Connaway et al., 2006; Connaway et al., 2011; Connaway & Dickey, 2010; Dervin et al., 2006; Prabha et al., 2006) suggest that, when given a choice, undergraduate information seekers will turn to the search options that are most convenient, often willing to sacrifice quality of library resources in favor of the convenience and accessibility of Google.

Undergraduates find library resources difficult to use.

Despite being born in a time in which access to computers and digital information has been seemingly ubiquitous and information seekers are largely Internet and computer savvy, undergraduate students classified as Millennials and of the "Google Generation" [(born after 1993) (Rowlands et al., 2008)] often experience frustration with the information search process (Denison & Montgomery, 2012) and find library information technologies (e.g., online databases and library catalogs) difficult to use (Connaway et al., 2006; Hampton-Reeves et al., 2009; Large, 2006; Williams & Rowlands, 2007; Wong et al., 2009). A frequently occurring theme noted in information seeking user behavior studies with undergraduates is that many users easily become frustrated when searching for information using academic library resources such as online databases, often turning to information sources available outside the library (Denison & Montgomery, 2012; Foster & MacDonald, 2013; Wong et al., 2009). In their study of user behavior of undergraduate, postgraduate, and expert researchers (n=34), Wong et al. (2009) noted

that participants frequently had difficulty navigating the web-based library resources, thus "distract[ing] users from focusing on the content, analysis, and evaluation that would help them learn and make sense of what they have discovered" (p. 6). Participants in this study became frustrated when they were unable to obtain full text documents using library databases, prompting them to turn to external resources like Google and Google Scholar, "where despite having no promise of the article, and where the scholarly quality cannot be assured, one still has a much higher chance of finding the article to download" (p. 8) and "always return[s] a list of results" (p. 78). Based on their findings, Wong et al. (2009) made a number of recommendations for libraries including development of a standardized platform for resource discovery with attributes that help users find their way around the systems while also making it easier for users to identify appropriate resources for their study (including free resources).

Studies conducted by Denison and Montgomery (2012) and Foster and MacDonald (2013) yielded similar results to those obtained by the Wong et al. (2009). Denison and Montgomery (2012) evaluated the perceptions of 20 undergraduates using a combination of a sorting-board activity relating to a condition of library instruction and interviews with a smaller sample from the participant pool. The dominant theme that emerged from their study is that the participants found the process of information searching and retrieval using library resources to be difficult and frustrating. Consequently, many of the undergraduates compromised by choosing information resources that were not judged as being of high academic caliber.

Foster and MacDonald (2013), in a usability study in which undergraduates (n=6) were observed as they interacted with two different library discovery systems, noted that participants were able to complete little more than 50% of the research scenarios presented to them. Half of the participants said they would be more likely to leave any library site and do the search in Google, particularly when they did not understand what happened with their search using the library resources. Lending further support to the notion that undergraduate information seekers may not perceive their academic library systems to be usable, findings from a usability study (n=5) conducted by Fuller et al. (2009) indicated that undergraduate participants failed to complete the given research tasks of the study 66% of the time. Taken together, the results of the Foster and MacDonald (2013) and Fuller et al. (2009) studies suggest that when undergraduate information seekers find library resources frustrating to use, their motivation to use them diminishes, thus turning to Google where their return on investment of time and energy is more fruitful.

It appears that much of the frustration that results from interacting with web-based library tools and resources stems, in part, from difficulties interacting with library tool interfaces (Colón-Aguirre & Fleming-May, 2012; Connaway et al., 2006; Dermody & Majekodunmi, 2011; Wong et al., 2009). Colón-Aguirre and Fleming-May (2012) interviewed 21 undergraduate students (sophomore and above) about their approaches to gathering information sources for an assignment. Overall, participants expressed some level of frustration with the process of interacting with the online library catalog and database search platforms. In particular, participants expressed frustration with

identifying appropriate electronic resources among the vast array of databases. Those who were classified by the researchers as "library avoiders," individuals who only use the library if explicitly required, noted having trouble navigating the mechanics of locating material and working with the equipment. These findings suggest that undergraduate information seekers may benefit from more simplified interfaces that are less overwhelming and more attuned to their needs.

Dermody and Majekodunmi (2011) conducted a usability study with university students with print disabilities to better understand their library search experiences and identify barriers to information. Overall, participants rated their experiences of using the databases to retrieve and read full text articles as "difficult" to "somewhat challenging." Their comments further suggest that in order to find the articles they need, a simplified search interface and clear and proper placement of full text links to articles is necessary. One participant noted, "for every extra … button that can be clicked, the likelihood of people becoming confused increases" (Dermody & Majekodunmi, 2011, p. 155). Two of the participants noted that they prefer using Google Scholar because of its simple search interface compared to the databases used in this study (Dermody & Majekodunmi, 2011). Taken together, the results from the Colón-Aguirre and Fleming-May (2012) and Dermody and Majekodunmi (2011) studies help to illuminate the need for library web interfaces that are simple, easy to use, and elicit full text documents with few clicks of the mouse.

Noting similar results to those found by Colón-Aguirre and Fleming-May (2012) and Dermody and Majekodunmi (2011), Connaway et al. (2006), in their study of 307

academics noted that participants, regardless of status (faculty, graduate student, or undergraduate), found the library online catalogs difficult to use, reverting to other online sources to find items traditionally held by libraries. Focus group participants in this study suggested the library "…make the library catalog more like search engines" (Connaway et al., 2006, p. 16).

Expanding upon this desire for library digital interfaces that behave more like search engines, several researchers (Georgas, 2015; Holman, 2011; Turner, 2011) noted students' preferences for using natural language that is more conducive to successful searching using search engines than in library databases and online catalogs. For example, in study in which 32 undergraduates were observed searching for materials via both Google and a library search tool, Georgas (2015) noted that participants largely performed searches using natural language syntax (in both Google and library databases). Use of natural language syntax (e.g. "What are the effects of fracking on the economy of Ohio?") instead of keyword searches using Boolean operators such as *and, or,* and *not* (e.g., fracking and economy and Ohio) is typically not conducive for yielding successful results in library databases, while the algorithms that underlie online search engines such as Google are designed to accommodate such language. In a separate study, Turner (2011) conducted a comparison study in which 10 college students and 18 library staff members were observed as they conducted prescribed search tasks using the library website. Study findings suggest that librarians and students differ in their selection of search tools, syntax used for searching, expectations of library search tools and their content, and level of searching persistence (Turner, 2011). Library staff demonstrated use

of their prior knowledge of library systems and library holdings, while student participants did not use the specialized syntax required for many library databases and catalogs. Finally, in library usability studies conducted by Holman (2011) and Porter (2011) with undergraduate students (n=21, n=24), researchers noted that natural language searching was the most observed behavior of students performing searches, followed by key word searching. Holman (2011) further noted that misspellings had a significant impact on students' success and highlighted a major distinction between search engines and database algorithms, with search engines being more forgiving of such errors. Because undergraduate information seekers are largely inclined to use natural language syntax over the Boolean logic or keyword strategies typically required of library databases, libraries must consider whether to focus their energies on teaching students more effective syntax or redesigning the library information interfaces to behave "more like Google."

Technology preferences for information seeking.

While understanding undergraduate students' preferences for particular types of information resources is critical in meeting their needs, it is also important to consider the types of technology devices students prefer to use when seeking information digitally. In a recent survey study of 50,274 undergraduate students, Educause researchers noted that smartphone ownership among this population was at 92%, exceeding laptop ownership (91%) for the first time in the 11 years of tracking this data (Dahlstrom, Brooks, Grajek, & Reeves, 2015). Tablet ownership among this population was reported to be at 54%, while desktop ownership among undergraduate students hovered near 40%. Findings

from this study also revealed that nearly all of the respondents (92%) had at least two internet capable devices, with 64% having three such devices (Dahlstrom et al., 2015). With nearly ubiquitous prevalence of smartphones among college students, mobile website optimization, including academic library websites, has become increasingly important. Current research regarding mobile academic library websites has found that many students desire simple, streamlined navigation in mobile library sites that focuses upon only the most relevant services and information (Pendell & Bowman, 2012). Of particular relevance to academic libraries, findings from two recent studies suggest information seekers are interested in searching library databases through mobile sites, despite the fact that some databases are not optimized for mobile access and may be difficult to access from a phone (Pendell & Bowman, 2012; Seeholzer & Salem, 2011).

Undergraduate Students' Information Needs, Preferences, and the TAM

Usefulness of the digital library resources.

Returning to the TAM, a technology (e.g., library website) must be perceived to be both useful and easy to use for users to accept it. Numerous quantitative studies have identified the "usefulness" (i.e., value) of libraries such that library usage has been found to be positively correlated with graduation rates (Haddow, 2013; Mezick, 2007, 2015; Soria et al., 2013, 2014) and student academic achievement (e.g., GPA) (Goodall & Pattern, 2011; Hiscock, 1986; Soria et al., 2013, 2014; Wong & Webb, 2011). Further, students recognize the utility of the library for completing assignments in which course instructors require use of library resources (Colón-Aguirre & Fleming-May, 2012; Davis & Cohen, 2001; Robinson & Schlegl, 2004).

While undergraduate students may recognize the utility of the library such that they are extrinsically motivated to use library resources when required by their instructors in order to receive favorable grades, their intrinsic motivation to use these resources lies in question. Findings from numerous studies suggest that, regardless of context (academic or everyday needs), undergraduates are not intrinsically motivated to use the library and are inclined to turn to online search engines such as Google to fulfill their information needs for reasons of convenience, speed, and ease of use (Connaway et al., 2006; De Rosa, 2005, 2006; Dervin et al., 2006; Prabha et al., 2006; Wong et al., 2009). Further studies suggest undergraduates are largely satisfied with the results obtained through Google searching to meet their academic needs (De Rosa, 2005, 2006) and are willing to sacrifice quality of materials that could be obtained by using the library over the convenience and accessibility of Google (Brophy & Bawden, 2005). Through the lens of the expectancy-value theory of motivation, undergraduates' expectations of quick, convenient, easy, and satisfying information seeking experiences when using a search engine such as Google outweigh the value of resources that could be obtained by using online library resources. As undergraduates place greater value in search engines to meet their information needs, the utility of digital library resources for these users becomes tenuous.

Ease of use of digital library resources.

Overall, findings in the literature suggest undergraduate information seekers experience high failure rates in their academic library information seeking (Foster & MacDonald, 2013; Fuller et al., 2009), become easily frustrated using library resources

(Denison & Montgomery, 2012; Foster & MacDonald, 2013; Wong et al., 2009), and often turn to search engines such as Google for reasons relating to speed, convenience, and ease of use. (Connaway et al., 2006; De Rosa, 2005, 2006; Dervin et al., 2006; Prabha et al., 2006). According to the TAM, when digital interfaces such as online academic library resources have low usability with respect to parameters of efficiency, effectiveness, and satisfaction, user motivation to adopt these technologies is weakened as information seekers find other, more usable means (such as Google) to satisfy their needs.

When undergraduate information seekers encounter frustration and/or failure in their use of academic library interfaces, their self-efficacy comes into question, as "Individuals tend to select tasks and activities in which they feel competent and confident and avoid those in which they do not" (Schunk & Pajares, 2009, p. 37). Further, because many undergraduate information seekers find online library resources difficult to use, expectancy of success may not match the value they place in using these resources, making online search engines such as Google the more attractive alternative (Connaway et al., 2006; De Rosa, 2005, 2006). Consequently, as undergraduate information seekers find using the online academic library resources to be difficult and find greater utility (efficiency, effectiveness, and satisfaction) in using online resources outside of the library, their motivation to use library resources is low.

Gaps in the Literature

Motivation in library and information seeking research.

Factors relating to undergraduate students' motivation to engage with library services have been scarcely addressed in the library and information seeking body of literature. Of the studies analyzed for this literature review, only a small selection included terminology relating to motivation (Colón-Aguirre & Fleming-May, 2012; Denison & Montgomery, 2012; Dermody & Majekodunmi, 2011; Haigh, 2013) and none of these studies used a motivational framework to guide their studies. Rather, researchers in three of the studies reviewed (Colón-Aguirre & Fleming-May, 2012; Denison & Montgomery, 2012; Haigh, 2013) suggested that students are only extrinsically motivated to use the library when required for a particular assignment. Dermody and Majekodunmi (2011) speculated that self-efficacy in using library resources may play a role in a student's choice to engage with the library.

Articles discussed in this literature review were further analyzed to determine whether key elements relating to the expectancy-value theory of motivation including expectancies for success, value in using the library, and cost factors relating to motivation were addressed. Of the studies reviewed, only two discussed students' expectancies for success (Dermody & Majekodunmi, 2011; Porter, 2011), two specifically mentioned value from the students' perspective (Denison & Montgomery, 2012; Rempel, Buck, & Deitering, 2013), while a large number of studies (e.g., Dermody & Majekodunmi, 2011; Foster & MacDonald, 2013; Fuller et al., 2009) noted issues relating to cost factors. In particular, findings by Dermody & Majekodunmi (2011) and Porter (2011) suggest

students do not have high expectations for success when using the library, even after receiving instruction. Similarly, students' perceptions of the value of the library as a motivator to engage with these resources were scarcely noted in the literature. Findings by Denison and Montgomery (2012) and Rempel et al. (2013) suggest students use quality resources available in the library so as not to compromise their education or when they need a scholarly work from a particular field. Cost, however, a critical component of value according to the expectancy-value theory of motivation (Eccles et al., 1983; Flake, Barron, Hullerman, McCoach, & Welsh, 2015) bears much mention in this body of literature. Across these studies, researchers frequently noted that time, frustration, high failure rates, convenience/familiarity (preference for Google), and difficulty were major cost factors that may adversely affect students' motivation to use the library (Colón-Aguirre & Fleming-May, 2012; Dermody & Majekodunmi, 2011; Foster & MacDonald, 2013; Fuller et al., 2009).

Student perspectives.

Olsson (2009), in a critique of the library and information science scholar, states, "Despite claims to have moved beyond a systems-centric approach … most prevailing approaches [to information behavior research] manifest a task-orientation that is a legacy of the field's origins in library and information system evaluation" (pp. 22-23). The current body of literature presented in this review suggests that LIS researchers have not yet moved away from this prevailing orientation to scholarship and discourse. In other words, the majority of studies analyzed for this review have focused upon if, whether, or how users engage with the library systems in order to achieve particular tasks rather than

looking upon these information seekers as "knowing subjects" and "cultural experts" (Talja, 1997) who may value both library resources as well as information available through the Internet via search engines and collaborative, online knowledge sharing tools. What is often missing from these user behavior studies are the voices of the individuals and their perspectives of why they act as they do and what they imagine would better meet their needs. To begin to fill this gap and more fully understand undergraduate students' information seeking needs, preferences, and behaviors in support of university retention goals, this study utilized a mixed method design in which trends can be better understood and potential ways by which libraries can better meet undergraduate students' information needs are explored by placing students at the center of the design and seeking their input about their information use environments (Taylor, 1991). This design allows for a better understanding to emerge with regards to who the users are, what are their settings, social networks, problems that lead to information needs, and the barriers they encounter in meeting their information needs.

Summary: Literature Review

Regardless of research methods (e.g., surveys, experimental, citation analysis, interviews, usability studies), findings from this literature review suggest convenience, speed, and ease of use of search engines (e.g., Google) are the primary selection criteria for undergraduate students when choosing among information sources. A second prevailing theme that emerged from this review is that undergraduate students find library resources difficult to use. Despite efforts by libraries to make their systems more usable through interface design changes, increasing instruction, embedding librarians in learning

communities, introductory writing/research courses and first-year seminars, and more, the gap continues to exist between undergraduate students and their academic libraries. The absence of research that acknowledges the contextual and social cognitive factors of students and considers motivational issues relating to information seeking presents a great opportunity for exploration in this study, as this approach may help to bring about answers to the perplexing problem of undergraduate students' disengagement from their academic libraries. The expectancy-value theory of motivation (Eccles et al., 1983) was selected as the overarching framework by which to explore these motivational issues relating to academic library underutilization, as this model allows for both the expectancies for success (closely aligned to usability) **and** subjective task value (closely aligned to usefulness) to be assessed in a way that puts the user at the center of the design. Undergraduate students' everyday life information seeking needs and preferences were also included in this model as a way by which to explore whether the academic library can viably reinvent itself as an information hub of the university that brings together both scholarly and non-scholarly resources, thereby increasing the relevance of the library by holistically meeting the information needs of students in support university retention.

Research Questions and Propositions

To better understand the factors relating to undergraduate student engagement/ disengagement with the academic library and to explore whether university libraries should expand their role beyond providing academic resources and services into more "real-life" areas that are important to the daily lives of undergraduate students and in

support of the university goal of retention, this study seeks to answer four primary research questions and 10 corresponding propositions:

1. **What motivational variables best predict library utilization by undergraduate students?**

   Proposition 1: Motivational variables are predictive of undergraduate students' utilization of academic library resources.

   Proposition 2: Group differences exist among undergraduate students with respect to their utilization of academic library resources.

2. **What are the social cognitive information needs of successful students?**

   Proposition 3: There are common educational barriers among undergraduate students.

   Proposition 4: Group differences exist among undergraduate students with respect to their common educational barriers.

   Proposition 5: Undergraduate students' contextual background and social cognitive factors are predictive of their utilization of academic library resources.

   Proposition 6: Undergraduate students' contextual background and social cognitive factors are predictive of their overall academic success.

3. **How do undergraduate students prefer to meet their information needs?**

   Proposition 7: There are commonalities among undergraduate students with respect to the types of information resources they prefer to use for information seeking.

Proposition 8: There are commonalities among undergraduate students with respect to the types of technology they prefer to use for information seeking.

Proposition 9: Group differences exist among undergraduate students with respect to their preferences for information seeking.

4. **To what extent is addressing the everyday life information needs of students a viable option for academic libraries?**

   Proposition 10: There is a clear overlap between the everyday life information needs of undergraduate students and the ability of academic libraries to meet these needs.

CHAPTER III

METHODS

Introduction

To address the four research questions and ten corresponding propositions outlined for this study, a *quantitative dominant four-phase sequential mixed methods design* was implemented at three purposely selected public 4-year colleges and universities across the United States. Mixed research and analysis was utilized, as quantitative and qualitative data, when used alone, were insufficient to answer the research questions identified for this study (Creswell & Plano Clark, 2011). More specifically, the multi-phase design of this study allowed for an in-depth examination of factors relating to undergraduate student information seeking through an "iteration of connected quantitative and qualitative studies that are sequentially aligned, with each new approach building on what was learned previously" (Creswell & Plano Clark, 2011, p. 100). In other words, mixed methods allowed a more complete picture of an event, process, or situation than using a single method. Johnson, Onwuegbuzie, and Turner (2007) explain,

> Mixed methods research is the type of research in which a researcher or team of researchers combines elements of qualitative and quantitative research approaches (e.g., use of qualitative and quantitative viewpoints, data collection, analysis, inference techniques) for the broad purposes of breadth and depth of understanding and corroboration (p. 123).

While quantitative designs can be used to produce large data sets and allow for statistical testing, the qualitative component, particularly the students' voices, has often been absent from the conversation about undergraduate students' information needs, preferences, and behaviors. Though libraries are beginning to recognize that their systems may be difficult to use and are working to address these issues, findings from a critical review of the library utilization literature suggest that the voices of the students are often muted in the conversations (Croxton, 2015). Consequently, undergraduate students continue to turn to more convenient sources such as Google to meet their information needs (Connaway et al., 2006; Prabha et al., 2006), even when they recognize the value of library resources (Brophy & Bawden, 2005). Therefore, by taking a pragmatic approach that brings quantitative and qualitative data together, a deeper, more relevant understanding of undergraduate information seeking needs, preferences, and motivational behavior is expected to emerge from this study.

Study Design and Rationale for Selection

A quantitative dominant four-phase sequential mixed methods design (Figure 4) was selected for this study in order to allow each subsequent phase of data collection to developmentally build off the findings from the preceding phases. A mixed design approach for this study was further justified as it allowed the researcher to seek triangulation of findings across methods that are complementary such that data from later phases of the study helped to clarify findings in earlier phases (Green, Caracelli, & Graham, 1989). In this design, the quantitative (QUAN) data collection and analysis conducted during Phase II was the dominant phase of the study, while the qualitative data

(qual) collected in Phases I and III and the quantitative data (quan) collected in Phase III largely served to provide deeper insights into the Phase II quantitative findings.

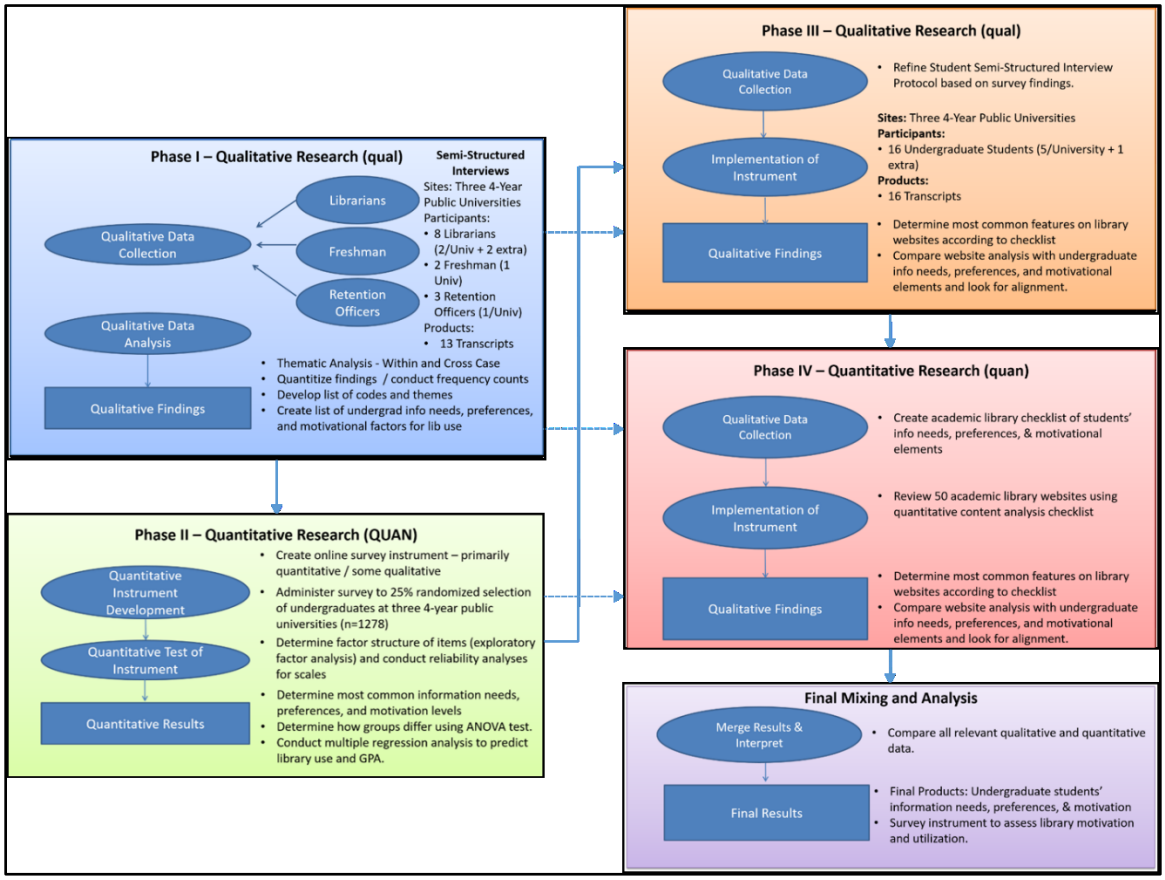

Figure 4. Quantitative Dominant Four Phase Sequential Mixed Methods Design

Phase I was comprised of qualitative data collection in which interviews were conducted with university enrollment and retention officers, academic librarians, and undergraduate freshman in order to gain an understanding of the common information needs, educational barriers, and information seeking preferences of undergraduate students. Phase I data underwent thematic analysis and were also transformed into

quantitative data, a form of "mixing during data analysis" (Creswell & Plano-Clark, 2011, p. 67), in order to calculate frequency counts of most commonly cited information needs, barriers, and preferences of undergraduate students. This data transformation allowed trends from Phase I data to be compared to data trends noted in subsequent phases of the study.

Mixing of methods occurred between Phases I and II via a strategy of "connecting" in which the qualitative results from Phase I helped build to the collection of quantitative survey data in Phase II (Creswell & Plano-Clark, p. 67). While the Phase II survey instrument was originally developed based upon findings from the literature, numerous modifications and additions were made to the instrument as a result of Phase I findings. This survey instrument was designed to assess undergraduate students' information seeking needs, preferences, library motivation, educational barriers, and social cognitive factors that may impact their information needs and university persistence on a large scale. Predictive models for factors contributing to both library utilization and academic success were developed and tested for significance using Phase II data.

In Phase III, semi-structured follow-up interviews with volunteers from the Phase II survey completers were conducted with a purposely selected sample of participants in order to bring greater depth and understanding to the survey results. Again, a mixing strategy of "connecting" was utilized in which findings from Phase I qualitative data and Phase II quantitative data helped to build to the collection of Phase III qualitative data. Phase III data underwent thematic analysis and, similar to Phase I procedures, were

transformed into quantitative data, thereby allowing a comparison of trends across Phases I through III.

Finally, in Phase IV, academic library websites were reviewed using a checklist developed from a mixing of the quantitized Phase I and III data and the Phase II quantitative survey data in order to assess the alignment between what students need and want with respect to information seeking and what libraries currently have. At the conclusion of Phase IV, qualitative and quantitized interview data and quantitative findings from the survey and library website review were mixed for interpretation, allowing for conclusions and inferences to be drawn across all data sets to answer to Research Questions 1-4 and their corresponding propositions. Each phase of the study is discussed in greater depth below, giving particular attention to sampling of participants, instrumentation and data collection, data analysis, and validity and reliability considerations.

Maximization of Legitimation in Research Design

In mixed research, the term *legitimation* has been proposed as a term to describe a third, separate set of expectations for evaluation of the quality (validity, trustworthiness, credibility, etc.) of mixed methods studies (Creswell & Plano Clark, 2011; Dellinger & Leech, 2007; O'Cathain, Murphy, & Nicholl, 2008). A legitimation criteria for mixed research is necessary to address the problems that may arise due to mixing of data and methods that are not particularly associated with mono-method designs (Onwuegbuzie & Johnson, 2006). In quantitative research, *validity* refers to whether one can draw meaningful and useful inferences from particular instruments (Creswell, 2009). Creswell

and Plano Clark (2011) explain that quantitative validity means that scores received from participants are meaningful indicators of the construct being measured. In qualitative research, terms such as *trustworthiness, authenticity, credibility, transferability, and dependability* are used to discuss whether a study authentically captures the lived experiences of people (Creswell, 2013; Lincoln & Guba, 1985).

To maximize legitimation in mixed research, a variety of evaluation frameworks have been proposed, including those suggested by Creswell and Plano Clark (2011), Dellinger and Leech (2007), Onwuegbuzie and Johnson, (2006), and O'Cathain et al. (2008). O'Cathain et al.'s (2008) "Good Reporting of a Mixed Methods Study" (GRAMMS) criteria was selected and adapted for this study as it provides a practical, yet comprehensive set of criteria that evaluators can consider when designing and evaluating mixed method studies. An evaluation rubric modeled after the

Validity/Legitimation Evaluation Rubric

1. Justification for Use of Mixed Methods
   - Did the author justify the reasons for using a mixed methods approach?
2. Description of Mixed Methods Design
   - Did the author adequately describe the design in terms of purpose, sequence, and method?
     - ✓ Purpose of combining methods
     - ✓ Priority of strands
     - ✓ Sequence of strands
     - ✓ Stage(s) where mixing occurs
     - ✓ Discussion of design rigor
3. Description of each method in terms of sampling, data collection, and analysis
   - Description of quantitative or qualitative methods
   - Sampling
   - Data collection
   - Validity and reliability considerations
   - Analysis
4. Assessment of Mixing
   - Did the author address mixing?
     - ✓ Where
     - ✓ How
     - ✓ Who participated
   - Did the author describe limitations of one method associated with any other method?
   - Did the author describe insights gained from mixing?

Figure 5. Validity/Legitimation Evaluation Rubric

GRAMMS criteria was developed by the researcher (Figure 5) to serve as a checklist to ensure the results are valid, trustworthy, or legitimate by attending to the specific validity considerations of both the quantitative and qualitative methods individually as well as those relating to mixing, including how subsequent phases build off preceding phases and how data is merged and analyzed to explain and bring a richer understanding about undergraduate students' information seeking behavior, preferences, and motivation.

Participants

Study Context

The primary population of interest in this study consists of undergraduate students between the ages of 18-24 who are pursuing a Bachelor's degree. This age group was selected for this study, as the National Center for Education Statistics (2014) identified this age group as being largely reflective of the overall undergraduate student population. The sampling frame of participants in this study included undergraduate students enrolled in large, 4-year public universities and colleges in the United States. In addition, university retention officers and academic librarians employed by these public institutions of higher education were included in the sampling pool for this study.

Research Sites

Three large, primarily residential, 4-year or above public universities, as classified by the Carnegie Classification of Institutions of Higher Education (Carnegie, 2015) were purposely selected as research sites for this study. According to the Carnegie Classifications (2015), this designation is defined as,

> Fall enrollment data indicate FTE enrollment [2010] of at least 10,000 degree-seeking students at these bachelor's or higher degree granting institutions. 25-49 percent of degree-seeking undergraduates live on campus [institutionally –owned, -controlled, or –affiliated housing] and at least 50 percent attend full time.

Further, each of the universities selected for this study has an enrollment profile designated as High Undergraduate, which is defined by Carnegie (2015) as having "Fall enrollment data includes both undergraduate and graduate students, with the latter group accounting for 10–24 percent of FTE enrollment."

The universities selected for this study are geographically distributed across the United States, with one university selected from each of the three regions delineated in Figure 6. These universities are henceforth referred to in this study as University 1, University 2, and University 3 according to their corresponding regions. University sites invited to participate in this study fit the designated profile (large, residential, 4-year or above, high undergraduate) and had a university librarian or dean who was known to the researcher or a member of the researcher's advisory committee. A sample letter to University Librarians/Deans, inviting them to participate in this study, is available in Appendix A. Once written confirmation of interest in participating in this study was received from each of the

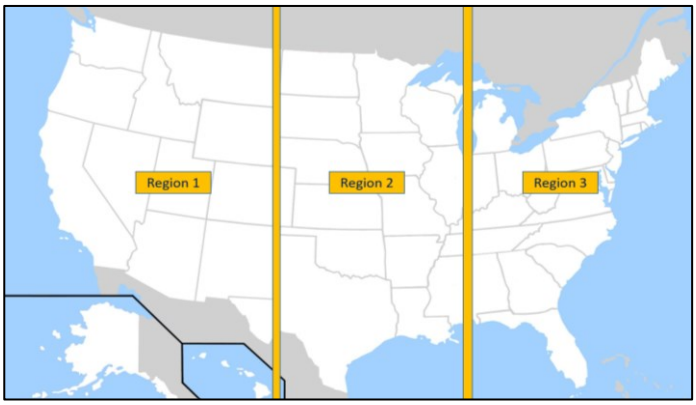

Figure 6. Three Large Public Universities

university librarians, formal permissions were sought to conduct research at each of these three institutions. Institutional Review Board (IRB) applications to conduct research were submitted and approval was granted to conduct research at University 2 and University 3 during the Spring 2016 academic semester. With formal IRB approval in place from these two universities, the Vice President for Research and Creative Scholarship at University 1 deemed that the already approved IRB applications at the other institutions were sufficient and also granted permission to conduct research at this university during the Spring 2016 semester. The undergraduate demographic profiles and graduation rates at each of these universities, as reported on their websites as of Spring 2016, is outlined in Table 1 below. (Note: To ensure the anonymity of the participating universities and study participants, the citations for this information are not listed.)

Phase I Participants

In Phase I of the study, 13 individuals were purposely selected and participated in one-on-one semi-structured interviews with the researcher (n=8 academic libraries, n=3 university enrollment and retention officials, n=2 freshman students). Academic librarians who were particularly knowledgeable about undergraduate students' information seeking needs, preferences, and motivation were identified for participation by each University's academic library dean. Upon identification of potential librarian volunteers, a follow-up letter was sent to these individuals by the researcher, inviting their participation (Appendix B) in the study. Eight librarians agreed to participate in semi-structured interviews and are henceforth referred to with the following designations:

- University 1: L5 & L6
- University 2: L7 & L8
- University 3: L1, L2, L3, & L4

Table 1

University Undergraduate Student Enrollment Profiles

	Univ 1 (N=8732)	Univ 2 (N=31,302)	Univ3 (N=15,951)
Category	n (% of Total)	n (% of Total)	n (% of Total)
Enrollment Selectivity*	Selective	More Selective	Selective
Gender			
Male	4,018 (46.0)	17,380 (55.5)	5,402 (33.9)
Female	4,714 (54.0)	13,922 (44.5)	10,549 (66.1)
Race**			
Non-Res Alien	353 (3.5)	--	401 (2.5)
White	8,181(82.1)	14,998 (47.9)	8,219 (51.5)
Black/Afr Am	86 (0.9)	1,684 (5.4)	4,389 (27.5)
Hispanic/Latino	403 (4.0)	2,971 (9.5)	1,194 (7.5)
Native Am	602 (6.0)	18 (0.0)	56 (0.4)
Asian/Pacific Is	157 (1.6)	5,351 (17.1)	772 (4.8)
2 or More	186 (1.9)	903 (2.9)	684 (4.3)
Other	2 (0.0)	5,377 (17.2)	236 (1.5)
Year			
Freshman	2,080 (25.4)	4,803 (15.3)	3,857 (24.2)
Sophomore	1,760 (21.5)	6,318 (20.2)	2,960 (18.6)
Junior	1,802 (22.0)	7,633 (24.4)	3,778 (23.7)
Senior	2,552 (31.1)	11,958 (38.2)	4,563 (28.6)
Other	--	590 (1.9)	793 (5.0)
Enrollment Status***			
Full-Time	7,601 (87.0)	31,989 (97.3)	13,540 (84.4)
Part-Time	1,131 (13.0)	889 (2.7)	2,501 (15.6)
Age			
< 25	6,811 (81.8)	30,170 (97.4)	13,199 (82.7)
25 +	1,558 (18.7)	813 (2.6)	2,752 (17.3)
6-Year Grad Rate (2009)	46.3%	85.1%	56.0%

*Carnegie (2015) Definitions: Selective = 40th to 80th percentile of selectivity among all baccalaureate institutions; More Selective = 80th to 100th percentile of selectivity among all baccalaureate institutions
**Race - University 1 – Students were permitted to report as many ethnicities as they deemed appropriate, thus totals exceed actual enrollment figures.
***Enrollment Status - University 3 – Data from Fall 2015.

Because university enrollment and retention officers are intimately aware of student drop-out trends and university initiatives related to student success, enrollment, and retention initiatives at their universities, key leaders at each university were invited to participate in one-on-one semi-structured interviews with the researcher (see Appendix C for invitation letter). Ultimately, three university officials agreed to participate in semi-structured interviews and are subsequently referred in this study with the following designations:

- University 1 (Associate Vice President for Enrollment and Student Success): R2
- University 2 (Assistant Director for Academic Achievement): R1
- University 3 (Vice Chancellor for Enrollment and Student Success + 11 committee members): R3

Finally, two freshman students from University 3 (S1 and S2) participated in one-on-one semi-structured interviews with the researcher. Student interviews during this phase of the study were restricted to freshman in their first year of study, as findings in the literature suggest these students are the most vulnerable for dropping out (Schneider, 2010; Tinto & Pusser, 2006). At each university, names of potential freshman student participants were solicited from the librarians who participated in interviews in order to gain insights into undergraduate students' information needs, preferences, and motivation to use library resources. While students from all three universities were invited (see Appendix D for invitation letter), only two freshman from University 3 agreed to participate. These individuals were awarded a $10 Amazon gift card that was purchased by the researcher as an incentive and token of gratitude.

Phase II Participants

In Phase II of the study, undergraduate students from the three participating universities were invited to complete an online survey. From each of these universities, a randomized list of 25% of the undergraduate students enrolled for courses in the Spring 2016 semester was provided by each institution's research office. Ultimately, 13,268 undergraduate students were invited to participate in this phase of the study, with a 9.63% response rate (n=1278) and 71.20% completion rate (n=910). These data are further outlined in Table 2 below.

Table 2

Survey Response and Completion Rates

		Responses			Completed	
	Invited	n	Rate (%)	% of Total	n	Rate (%)
University 1	1854	107	5.77	8.4	92	85.98
University 2	7650	769	10.33	60.2	521	67.75
University 3	3764	402	10.68	31.5	297	73.88
Total	13,268	1278	9.63	100	910	71.20

In the aggregate, survey respondents were primarily non-first generation students (76.0%, n=971), female (64.6%, n=290), less than 25 years (89.0%, n=754), white (Caucasian) (59.7%), enrolled full-time (91.7%, n=775), and spoke English as their first language at home (74.1%, n=625). Student majors were varied and largely included Science, Technology, and Math (STEM) (26.9%, n=227), Social Sciences (17.4%, n=147), Business (15.5%, n=131), Health and Human Services (14.5%, n=122), and Arts and Humanities (13.0%, n=100). Participants largely reported their GPAs to be above

average (3.1 and above) (77.2%, n=643). Reported family household incomes of participants fell largely into the middle class ($35,000 - $99,999/year, 36.1%, n=305), with 18.5% (n=156) falling below this threshold (< $35,000/year) and 26.0% (n=220) falling into the upper middle class or higher threshold ($100,000/year or above). The majority of participants (64.1%, n=542) reported that their parents held a Bachelor's degree or higher (Bachelor's = 27.1%, n=229; Master's = 25.1%, n=212; Doctoral = 11.9%, n=101). Undergraduate survey respondents' demographics are outlined in further detail in Appendix E.

Phase III Participants

In Phase III of the study, 22 undergraduate students were invited and 16 elected to participate in one-on-one semi-structured interviews with the researcher. The Phase III participants are henceforth referred to in this study by their participant identification codes assigned by the researcher (PS1 – PS16). Each student who participated in an interview received a $10 Amazon gift card that was purchased by the researcher as an incentive and token of appreciation.

The Phase III participant pool was comprised of 198 Phase II participants who expressed a willingness on the online survey to participate in a follow-up interview with the researcher. In this strand, purposeful, nonprobability sampling for heterogeneity (Tashakkori & Teddlie, 1998) was employed such that prospective interviewees were selected in a way that provided a cross-sectional representation among participants with respect to year in school, gender, and race/ethnicity in attempt to accurately reflect the demographic makeup of the participating universities. Additionally, GPA, first generation

status, and academic major were considered in participant selection as findings in the literature and early analysis of the Phase I and Phase II data suggested these factors may impact students' information seeking needs, preferences, and/or behaviors. Participants represented all three universities (University 1, n=5; University 2, n=5; University 3, n=6), were nearly evenly distributed with respect to gender (male, n=7; female, n=8; other, n=1), were slightly more heavily represented in the earlier years in school (freshman, n=6, sophomore, n=4, junior, n=3; senior, n=3), and had varied GPAs (2.0 or below, n=1; 2.1-2.5, n=2; 2.6-3.0, n=4; 3.1-3.5, n=4; and 3.6-4.0, n=5). Of these participants, five (31.25%) were first generation college students, and 15 were between the ages of 18-24 years (one participant > 24 years). Attendance at a library instruction class varied (0 classes, n=1, 6.25%; 1 class, n=11, 68.75%; 2 + classes, n=4, 25.0%), as did their reported usage of both the physical library and online library resources. Of the 16 interviewees, nearly half (43.8%, n=7) reported visiting library less than 5 times during the previous semester (0 times/semester, n=2, 12.5%; <5 times/semester, n=5, 31.25%; 1-3 times/mo, n=2, 12.5%; 1+ times/week, n=7, 43.75%). Similarly, slightly more than half (56%, n=9) of the participants reported that they had utilized the online library resources less than 5 times during the previous semester (0 times/semester, n=2, 12.5%; <5 times/semester, n=7, 43.75%; 1-3 times/month, n=4, 25.0%; and 1+ times/week, n=3, 18.75%). The demographic and library use profile of the Phase III participants as well as the profiles of the two Phase I student interviewees is outlined in greater detail in Appendix F.

Phase IV Participants

In Phase IV, 50 four-year, large, primarily residential, public universities were randomly selected from a list of 107 universities fitting these criteria as identified by the Carnegie Classification of Institutions of Higher Education (Carnegie, 2015). For each of these institutions, the university's library website underwent a feature analysis that was conducted by the researcher. The three original university sites for this study were randomly selected to be included in this university list and continue to be identified in this phase as University 1, 2, and 3. The additional 47 universities reviewed for this phase are henceforth referred to as University 4 – 50. The randomly selected universities were distributed across the five regions of the United States (West, n=9; Southwest, n=3; Northeast, n=8; Midwest, n=13, and Southeast, n=17) and were largely classified as selective or moderately selective (selective, n=24, 49%; moderately selective, n=24, 49%; inclusive, n=1, 2%; or not listed, n=1, 2%). The majority of the universities were classified as "balanced arts & science/professions" (n=26, 52%), with the remainder classified as "professions plus arts & sciences" (n=15, 30%), "arts & sciences plus professions" (n=6, 12%), and "arts & sciences focus" (n=3, 6%). The profiles for each of the selected universities are further outlined in Appendix G.

Instrumentation

Based upon a review of the literature related to the research questions, six primary constructs were identified and used to develop six separate data collection instruments. Instruments included three interview protocols that were administered during Phase I, an online survey implemented in Phase II, an interview protocol administered in Phase III,

and a website feature checklist that was implemented in Phase IV. Primary constructs of the study include: (1) motivation to use library sources, (2) social cognitive factors for career and academic persistence, (3) perceived barriers to achieving educational barriers, (4) resource preferences for information seeking, (5) technology tool preferences for information seeking, and (6) viability of the library in addressing the everyday life information needs of students in support of retention. Several of these constructs were further subdivided, as outlined in Table 3 below.

Table 3

Constructs and Subconstructs

Primary Construct	Sub-Constructs
Motivation	Expectancies for Success
	Subjective Task Value
	Cost Belief
Social Cognitive	Performance Goals
	Outcome Expectations
	Academic Self-Efficacy
Educational Barriers	--
Resource Preferences	Everyday Life Information Resource Preferences
	Academic Information Resource Preferences
Tech Preferences	Tech Preferences for Everyday Life Information Seeking
	Tech Preferences for Academic Information Seeking
Library Viability	--

To ensure all research questions, constructs, data collection instruments, and individual scale items were aligned, a research crosswalk was created (Appendix H) by the researcher that illustrates how each data collection strategy was utilized to answer each research question and proposition. All research questions had a minimum of three data sources for triangulation, a common validity approach in mixing methods studies in

which “the inquirer builds evidence for a code or theme from several sources or individuals” (Creswell & Plano-Clark, 2011, p. 212). The crosswalk further provides an outline of operational definitions, dependent and independent variables, data analysis plans, data collection strategies, and instrument question numbers.

Phase I Instrumentation

Three semi-structured interview protocols were developed by the researcher based upon findings from the literature review and were administered during Phase I. The interview questions were aligned to address the unique research questions of the study (see Research Crosswalk, Appendix H). A 24-question *librarian interview protocol* (Appendix I) was developed to address Research Questions 1-4. A 12-question retention *officer interview protocol* (Appendix J) was developed to address Research Questions 2 and 4 and a 25-question *freshman interview protocol* (Appendix K) was developed to address Research Questions 1-4. Doctoral advisory committee members, one doctoral student, and one doctoral candidate, all with expertise in qualitative research methods, reviewed these protocols for question clarity as well as face and construct validity. Further, the freshman interview protocol was field tested with two undergraduate students who were known to the researcher. All Phase I interviews lasted between 20 – 30 minutes and occurred via telephone.

Phase II Instrumentation

During Phase II, the quantitative dominant phase (QUAN) of the study, data were collected using undergraduate student participant responses to a 47-question online survey (Appendix L) that was developed by the researcher. Invitations to participate in

this study were sent via email to a randomly selected pool of participants during the mid-point of the Spring 2016 semester with two follow-up email reminders sent at one-week intervals (Appendix M).

Survey data were collected via Likert-type numerical ratings, check boxes, and open-ended responses to allow trends and predictability of library use and academic success to be assessed. Demographic variables including gender, age, race, credit hours, GPA, student status, major, first generation student, family income, parents' highest level of education, language spoken at home, international student status, and attendance at library instruction sessions were included in order to determine whether group differences were present. Scale items were measured using a 7-point agreement scale with 1 representing the lowest agreement rating and 7 representing the highest agreement rating. A 7-point scale was selected per findings from Krosnick and Fabrigar (1997) who argued that seven points seem to represent the best compromise between rating scales with too few choices that may fail to discriminate between respondents' judgments and scales with too many choices that may make it difficult for respondents to distinguish between categories (Groves et al., 2009).

Survey development process.

Survey development followed a seven-step design process developed by Artino, La Rochelle, Dezee, and Gehlbach (2014) in a guide they prepared for the international Association for Medical Education in Europe (AMEE) to aid education researchers in the design of self-administered surveys or questionnaires. In this guide, Artino et al. (2014) outline seven steps that synthesize multiple survey design techniques, including those

endorsed by the American Education Research Association (AERA), American Psychological Association (APA), and the National Council on Measurement in Education (NCME) in their 1999 *Standards for Educational and Psychological Testing.* Artino et al. (2014) suggest that "Addressing each of these steps systemically will improve the probability that survey designers will accurately measure what they intend to measure" (p. 463). These steps include: (1) conduct a literature review, (2) conduct interviews and/or focus groups, (3) synthesize the literature and interviews/focus groups, (4) develop items, (5) conduct expert validation, (6) conduct cognitive interviews, and (7) conduct pilot testing.

During **Step 1**, a comprehensive review of the literature was conducted prior to the development of any portion of the survey. This helped the researcher to identify key constructs outlined for this study (Table 3) as well as prior instrument scales of relevance to this study's survey including those developed and tested by Bean (1985), Cabrera et al. (1992), Eccles & Wigfield (1995), Flake et al. (2015), Kahn and Nauta (2001), Lent et al. (1997), Luzzo and McWhirter (2001), and Singh, Zhang, Horton, and Boekhorst (2012). **Step 2** of the survey development coincided with Phase I of the present study in which interviews were conducted with key librarians (n=8), enrollment and retention officers (n=3), and freshman students (n=2). The freshman student interviews were particularly important to the survey development as they helped the researcher better understand how the undergraduate student population conceptualizes and describes the constructs of interest. In **Step 3** of the survey instrument development, interview findings were analyzed, synthesized, and compared to the findings in the literature. As a result of this

mixed methods strategy of "connecting," gaps in currently existing scales as they relate to the goals of this study were identified and additional aspects of interest were identified. These additions included aspects relating to barriers to achieving academic goals, information needs, potential components relating to students' social cognitive background, and previous attendance at an academic library workshop/information session. These additional points of consideration are outlined in Table 4.

Table 4

Survey Development – Additional Items of Consideration Identified from Interviews

Category	Potential Items of Interest
Potential Barriers to Achieving Academic Goals:	• Difficulties with time management • Lack of awareness of campus support services • Difficulty transitioning to independent living • Challenges or lack of knowledge with technology • Poor writing skills • Uncertainty about major • Lack of commitment to major or university • Difficulty fitting in/social isolation • Difficulties in communal living situations
Information Needs	• Information about academic major • Information about career choices and career planning
Components relating to Social Cognitive Background	• Previous success as a student • Confidence in abilities to be successful at the university • Commitment to university • Confidence in finding employment after graduation that will be satisfying
Library Workshops	• Attendance at a library workshop

During **Step 4**, survey items were developed and/or adapted to correspond with the six primary constructs and 10 sub-constructs identified for the study (Table 3). These items were compiled into a 47 item online survey instrument (Appendix L) using the online survey development tool, Qualtrics. The survey included 17 demographic questions, 17 quantitative questions, 9 questions inviting open-ended responses, and 4 questions at the end of the survey inviting volunteers to participate in follow-up interviews with the researcher and/or participate in a drawing for a $50 Amazon gift card drawing incentive for completing the survey.

Finally, pilot testing (**Step 7**) commenced with the collection of data from undergraduate students (n=1,278) representing the three participating university sites for this study. While initial subscales that were adapted for this study were found to have good to strong Cronbach's alpha reliability scores (0.7 or above) as documented in prior research studies reported in the literature (see Appendix N), a comprehensive analysis of subscale reliability and normality was conducted for the present study. All Cronbach's alpha scores for the subscales in the present study were found to be good to excellent at α = .85 or above, with the exception of two subscales for which Cronbach's alpha scores fell slightly below α = .80 (Financial Issues, α = .744; Social Belonging/Mental Health α = .789). These findings are outlined below and described in greater detail in Appendices O, P, and Q.

Subscale development.

Many scale items were adapted from previously developed and tested instruments reported in the literature that were reported to have good to strong reliability (Cronbach's

alpha 0.7 or above) (Bean, 1985; Cabrera et al., 1992; Eccles & Wigfield, 1995; Flake et al., 2015; Kahn & Nauta, 2001; Lent et al., 1997; Luzzo & McWhirter, 2001; Singh et al., 2012). Initial constructs, items, original scale sources, and reliability measures of the original scales are outlined in Appendix N.

Motivation to use library resources was measured in the present study using subscales adapted from Eccles and Wigfield's (1995) expectancy-value theory of motivation relating to *expectancies for success* and *subjective task value* as well as a *cost belief* subscale that was adapted from a *cost dimension* subscale developed by Flake et al. (2015). Overall, reliability analysis suggests the three library motivation subscales used in this study have good to excellent reliability, with all Cronbach's Alpha scores greater than $\alpha = .85$ (Library Expectancies for Success Subscale, $\alpha = 0.873$; Library Value Subscale, $\alpha = .920$; Library Cost Subscale, $\alpha = .921$). These values meet or exceed Cronbach's alpha scores found in the original source instruments (Appendix N) relating to the expectancy-value theory of motivation (Eccles & Wigfield, 1995) and very closely align with reliability reported for Flake et al.'s (2015) cost belief subscale ($\alpha = .97$). These favorable comparisons between the use of the modified scales in the current study with the original source instruments help to establish consistent internal reliability of this instrument. To further assess whether the items identified to comprise the three subscales of the expectancy-value library motivation scale formed reliable constructs, Cronbach's alpha, corrected item total correlations, Cronbach's alpha if deleted, mean of inter-item correlations, and subscale normality were reviewed and found to fall within acceptable

parameters. The findings of this comprehensive subscale reliability and normality analysis are outlined in detail in Appendix O.

To assess social cognitive needs of undergraduate students, individual questions and/or subscales were adapted from studies by Cabrera et al. (1992), Kahn and Nauta (2001), Bean (1985), Lent et al. (1997), and Luzzo and McWhirter (2001). All subscales for the original social cognitive career constructs were found to have a high degree of internal reliability as reported in previous studies, with reported Cronbach's alpha scores at 0.81 or greater (see Appendix N). Overall, a reliability analysis of the social cognitive career subscales utilized in the present study (Performance Goals, Outcome Expectations, and Academic Self-Efficacy) suggests these subscales have good reliability, with all Cronbach's Alpha scores greater than $\alpha = .87$ with the exception of Performance Goals, for which Cronbach's alpha was not calculated, as this construct had only one item (Outcome Expectations, $\alpha = .874$; Academic Self-Efficacy, $\alpha = .871$). These values mirror very closely the Cronbach's alpha scores reported in studies that used the original source instruments (Appendix N), thereby helping to establish consistent internal reliability of this instrument. To further assess whether the items identified to comprise the social cognitive needs subscales formed reliable constructs, Cronbach's alpha, corrected item total correlations, Cronbach's alpha if deleted, mean of inter-item correlations, and subscale normality were reviewed and found to fall within acceptable parameters. The findings of this comprehensive subscale reliability and normality analysis are outlined in detail in Appendix P.

In addition to factors relating to social cognitive information needs of undergraduate students, educational barriers were considered to be potentially important factors in understanding undergraduates students' information seeking needs, preferences, behaviors, and motivation to utilize library resources (Kahn & Nauta, 2001; Lent et al., 1994, 2000). To identify potential barriers that undergraduate students may be likely to encounter during their time at their universities, Luzzo and McWhirter's (2001) 21-item Perception of Educational Barriers Scale (α = .93) was modified to include 24 items included in the present study. Reliability analysis was conducted on the full Educational Barriers scale as well as on four new subscales that were identified through a Principal Components Analysis using an oblimin rotation that was conducted by the researcher. These four factors, which accounted for 56.53% of the total variance among scores, include: (1) Support from Others, (2) Financial Related Issues, (3) Academic Readiness, and (4) Social Belonging and Mental Health. An analysis of reliability and normality for the full academic barriers scale and the four newly identified subscales was conducted and reliability was found to range from respectable to good after four items (28.15, 28.18, 28.19, and 28.31) that were initially included in the assessment were removed due to due to misfit with the other items in the scale and/or poor wording. (Full Scale, α = .921; Support from Others, α = .847; Financial Issues, α = .744; Academic Readiness, α = .860; Social Belonging and Mental Health, α = 0.789). In addition, Cronbach's alpha if deleted scores and corrected item-total correlations were reviewed and all fell within the limits of acceptability. Analysis of normality of the combined average score for Educational Barriers suggests the distribution approaches normality.

(See Appendix Q for a comprehensive report of the educational barriers scale principal components analysis, scale and subscale reliability, and review of normality.)

Finally, survey questions regarding information seeking preferences of undergraduate students were largely adapted from the International Media and Information Literacy Survey (IMILS) of the Habits and Practices of University Students when undertaking Research Assignments, a project sponsored by UNESCO (Singh et al., 2012). All additional questions included on the survey were developed by the researcher based upon the study's unique research questions and findings from the literature.

Phase III Instrumentation

As in the preceding phase of the study, the mixing strategy of "connecting" was utilized in which findings from Phase I qualitative data and Phase II quantitative data helped to build to the development of the Phase III undergraduate student interview protocol and corresponding data collection. The semi-structured interview protocol that was initially used in Phase I interviews with freshman students was revised for administration to undergraduate students during Phase III (see Appendix R). More specifically, findings from the analysis of the Phase I interview data suggested that many new students enter the university feeling underprepared for college level coursework and have difficulty transitioning to living independently, which may present barriers to their academic success. As such, questions (item #3 and two follow-up questions) were added to the new Phase III interview protocol, asking participants to reflect upon their academic preparation and ability to live independently when they first started at the university. Further, Phase I data collected from interviews with university enrollment and retention

officials suggested some students struggle in their selection of and commitment to their academic majors as well as in their confidence that they will be able to find meaningful work in their areas of interest upon graduation. To further explore these potential barriers to students' academic success, items 4 and 5 were added to the Phase III protocol, asking students to explain their choice of major and their confidence that they will be able to find work in their field after graduation. To better understand potential factors relating to the social cognitive career theory factors with regards to performance goals and academic self-efficacy that were addressed in the Phase II quantitative survey, item #6 was added to the interview protocol, asking students about their confidence in their abilities to be academically successful while enrolled at the university and their commitment to graduating from their current universities. Finally, item #15 was added to the Phase III protocol to facilitate further conversation about interviewees' attendance at library instruction sessions, as analysis of Phase II quantitative survey data suggested that there were significant differences among students with regard to their perception of value of online library resources, based upon the number of library instruction sessions attended.

Though the initial student interview protocol that was developed and implemented during Phase I was field tested with two undergraduate students and implemented with two others, the modifications to this protocol prompted another round of review by experts in the field as well as additional field testing. The Phase III interview protocol was reviewed in-depth by one doctoral advisory committee member and one doctoral candidate for question clarity and alignment with the identified constructs for the full study. Further, the protocol was field tested with one undergraduate student who was

known to the researcher. This helped the researcher identify potential areas of confusion for interviewees, with minor modifications made accordingly.

Phase IV Instrumentation

To evaluate the alignment between undergraduate students' information needs and preferences with what academic library websites have available, a 47-item Library Website Key Features Analysis Checklist was developed by the researcher (see Appendix S) using the mixed methods "connecting" strategy in which findings revealed from the qualitative Phase I and III interview data and Phase II quantitative survey data led to the building of the quantitative Phase IV instrument. Each item included on this checklist was either noted by an interviewee (Phase I or Phase III) or received at least an above average rating on the Phase II survey (> 3.5 on a 7-point Likert scale) with regard to participants' likelihood of using particular services, tools, or features if offered by the university library. This list of identified potential library services, tools, and features and the study's data sources in which they were identified is outlined in Appendix T. Several items included in the checklist were unique to this study, including providing information at the library about campus resources, academic skills preparation, and financial information. Other items on the Phase IV checklist were not only identified in Phases I through III, but were also recognized as being important to students in other research studies (Dermody & Majekodunmi, 2011; Georgas, 2015; Head & Eisenberg, 2011; Holman, 2011; Singh et al., 2012; Turner, 2011; Wong et al., 2009). For example, in two separate large-scale quantitative studies, Head and Eisenberg (2011) and Singh et al. (2012) noted that information about health and wellness, news and current events, career

information, and social contacts were highly valued everyday life information needs of undergraduate students, further warranting inclusion on the Phase IV checklist. Likewise, Georgas (2015), Holman (2011), and Turner (2011) noted that use of natural language syntax when conducting library searches was common practice among undergraduate information seekers, thereby suggesting that this may be a valued interface design element of library websites. As such, an option for "allowing natural language searching" was included on the Phase IV checklist. Finally, findings from studies conducted by Dermody and Majekodunmi (2011) and Wong et al. (2009) and further reinforced by the Phase II findings from the present study suggest that undergraduate students may value both easy access to full-text documents *and* Google Scholar as a means by which to search online library materials and Google concurrently. Thus, questions relating to these options were included in the Phase IV checklist.

All items on this checklist were operationally defined by the researcher in order to establish specific evaluation criteria. For example, item #4 on the checklist, "Is there a single search box that can search the university's online catalog and online databases simultaneously with a single click?" was operationally defined by the researcher as, "*Typing in the term "juvenile diabetes" provides a list of results that includes print books and journal articles (minimum) (Yes/No/Other)."* One doctoral candidate and one doctoral student with expertise in both qualitative and quantitative data analysis reviewed the checklist, paying particular attention to the operational definitions developed by the researcher, in an effort to ensure question clarity and face validity.

The checklist was largely developed using a yes/no format; "yes" if the website had the feature and "no" if it did not. This type of data collection allowed for efficient analysis using descriptive statistics, including frequency counts and percentages. For each university identified for Phase IV, the researcher conducted a Google search for the university's library website and then conducted an in-depth examination of the site using the Phase IV checklist to guide the analysis.

Data Analysis

Phase I

During Phase I, all interviews were conducted by phone, recorded by the researcher, transcribed verbatim, and coded using the NVIVO 11 Starter software. Initial codes were devised from the literature review conducted for this study, while other new codes emerged from the data during an open-coding process adapted from Creswell (2013) in which raw data collected through interviews were analyzed on an ongoing basis throughout Phase I. A thematic analysis was conducted by the researcher in which transcripts were reviewed, coded, and recoded until themes emerged from the data. These themes were categorized according to the interviewee group (librarians, enrollment and retention officers, and undergraduate students) and were aligned to the four main research questions of the study. Phase I interview data were also mixed during analysis via a transformation technique in which qualitative data were quantitized based upon frequencies of responses according to each identified theme, thereby allowing for trends in data to be compared across subsequent phases of the study.

Phase II

Statistical analysis of quantitative survey data was conducted using the statistical software, IBM SPSS Statistics Version 23. Quantitative data analysis included both descriptive (means, frequency counts, standard deviations, and percentages) and inferential statistics including stepwise multiple regression analyses and analysis of variance (ANOVA). Significance thresholds were limited to ($p < .05$). Qualitative survey data collected via the open-ended response items were downloaded and compared to Phase I and Phase III interview findings for consistency using NVIVO 11 Starter.

One-way ANOVAs, a statistical test used to compare mean scores within and between groups, were calculated only for those samples meeting a minimum sample size, which was calculated using G*Power 3 using an a priori power analysis (Faul, Erdfelder, Buchner, & Lang, 2009). The designated significance level, alpha, was set at .05; the desired statistical power was set to .80; and the anticipated effect size was set at .20. With the aforementioned specifications, G*Power reported a minimum sample size of 246 for this study if assessing differences between three groups (e.g. three universities). The actual study sample of 1278 participants across three universities (University 1, n=107; University 2, n=769; University 3, n=402) ultimately met the minimum requirements as specified by G*Power. Because different ANOVA calculations in this study involved varied numbers of groups, further a priori determinations of sample size per G*Power analysis were assessed and are outlined below in Table 5. In addition, Levene's test for homogeneity of variance was conducted for all ANOVA tests. Assumptions of homogeneity of variance (Levene's test, $p > .05$) were met for all groups unless otherwise

noted. In cases in which assumptions of homogeneity of variance were violated, Welch's adjusted ANOVA test, a more robust test that is particularly useful with unequal sample sizes, was used in place of the traditional ANOVA *F* test. For all significant ANOVAs that included more than two categories for a demographic variable, Fisher's Least Significant Difference (LSD) comparisons were conducted to assess where group differences occur. The LSD procedure consists of running pairwise comparisons among the means using a standard Student's *t* test. Though the accuracy of the LSD procedure is sometimes called into question when there are many means to compare, Howell (2013) explains that it is a very legitimate and accurate procedure to use when there are only a minimal number of means to compare, as is the case with the present study. In cases in which assumptions of homogeneity of variance were violated and a Welch's ANOVA test was calculated instead of the traditional ANOVA F test, a Games-Howell post hoc test was conducted in place of Fisher's LSD.

Table 5

G*Power – A Priori Determination of Sample Size

Groups	2	3	4	5	6	7	8
Required Sample Size	200	246	280	305	330	350	368
Minimum # in Each Group	100	82	70	61	55	50	46

To answer Research Question 1, which relates to how well motivational variables predict library usage and to assess the truth of proposition 1, stepwise multiple regression analyses were conducted using the three motivation subscales (expectancies for success, value, and cost belief) to predict the dependent variables, in-person and online "library

use." Stepwise multiple regression analysis was utilized, as it allowed the researcher to explore the data for relationships when there was uncertainty as to whether relationships did, in fact, exist (Vogt & Johnson, 2011). The truth of proposition 2 was assessed using ANOVAs and post hoc comparisons across all demographic grouping variables.

Multiple statistical analytical strategies were used to answer Research Question 2 and corresponding propositions 3 through 6, which relate to the social cognitive and career information needs of undergraduate students. To assess the truth of proposition 3, frequency counts from survey data relating to educational barriers were calculated. To assess the truth of proposition 4, ANOVAs and corresponding post hoc analyses when relevant were analyzed across all demographic grouping variables. To determine the truth of propositions 5 and 6, stepwise multiple regression analyses were conducted across the four social cognitive career theory subscales (performance goals, outcome expectations, academic self-efficacy, and educational barriers) as they relate to the predictability of the dependent variables "library use" and "academic success."

To answer Research Question 3 and propositions 7 and 8, which pertain to information seeking preferences of undergraduate students, descriptive statistics including means, standard deviations, and percent frequencies were calculated. To assess the truth of proposition 9, which relates to the presence of group differences, ANOVAs and post hoc analyses were calculated across all demographic groups.

Phase III

Data analysis of the Phase III undergraduate student interview transcripts followed the same process outlined above for Phase I data. All interviews were conducted

by phone, recorded, transcribed verbatim, and reviewed by the researcher to ensure consistency of findings and themes across methods. This entailed using the same initial coding scheme that was devised during Phase I, though expansion of this coding did occur based upon new themes that emerged from this set of data. Further, as was done during Phase I data analysis, Phase III interview data were mixed via transformation in which they were quantitized based upon number of responses per theme, further allowing a comparison of trends across Phases I through III.

Phase IV

To answer Research Question 4 and proposition 10, which pertain to the viability of academic libraries in expanding their services to address everyday life information needs of undergraduate students, descriptive statistics, including means, frequency counts, and percentages were calculated using Microsoft Excel 2013. Data were initially collected using an online form created in Google Drive that corresponded to the Phase IV Library Website Feature Analysis Checklist (Appendix S). This data was automatically saved into a corresponding Google Spreadsheet, which was then downloaded to an Excel 2013 file on the researcher's computer where it underwent descriptive statistical analysis.

Validity and Reliability Considerations

Ensuring research methods are both valid and reliable is of utmost importance to this study. Validity and reliability considerations have been discussed throughout the description of the Instruments and Data Analysis and are further summarized below. For the quantitative components of the study, validity refers to whether meaningful and useful inferences can be made about the study's constructs from data collected using

particular instruments (Creswell, 2009). Rather than discussing validity in qualitative research, terms such as *trustworthiness* and *credibility* are used to assess whether a study authentically captures the lived experiences of people (Creswell, 2013). Reliability, which is of primary concern in the quantitative survey component of this study, refers to the extent to which scores on items within an instrument scale are internally consistent and stable over time (Creswell, 2009).

Role of the Researcher

In order to address potential threats to validity and increase the credibility of the conclusions to the study, it is important to acknowledge the role and potential influence of the researcher. While it is impossible to eliminate the influence of the researcher (Hammersley & Atkinson, 1995), it is important to acknowledge how one's values and background may influence interpretation of the data. The researcher is a white, middle-aged female brought up in a middle class, Midwestern, Anglo-Saxon, Protestant environment. She is a first generation college student raised by parents who placed great value in education. The researcher has always been a very goal directed, successful student. Holding a master's degree in library and information studies, she has worked as an academic librarian in both a community college and a 4-year university. Further, the researcher has been involved in conducting research about individuals and their use of libraries as well as the usability of library and information systems throughout her professional and academic career. These experiences and background may influence how the study's data is interpreted with respect to perceptions and attitudes about academic library usage and undergraduate students' information seeking preferences, needs, and

motivation. It is a belief of the researcher that the library is a critical component of the university and that engagement with online academic libraries is an important element of a student's academic success. While it is hoped that the study's data will be analyzed with an unbiased eye, doing so is an impossibility.

Validity Checks in Study Design

The potential for researcher bias was checked throughout this study in multiple ways. All interview protocols and the survey instrument used in this study were reviewed by the researcher's doctoral committee members and fellow doctoral students and candidates to ensure that questions were neither poorly worded nor leading. Further, *triangulation* was utilized during the data collection phase of the study to reduce the risk of bias that may result from a specific method (Maxwell, 2013). Data were collected from multiple sources including interviews, a survey, and a website feature analysis. Further, rigorous examination of both the supporting and discrepant data was undertaken throughout the study. The sequential design of the study allowed for findings that were surprising, discrepant, or inconclusive in earlier phases of the study to be explored in greater depth in subsequent phases. Though utilization of each of these strategies does not verify the conclusions of the study, their diligent use helps to lend validity and credibility to the study findings. Embedding and attending to validity checks throughout the study has helped to rule out threats to potential interpretations and explanations from the study.

Efforts were made to ensure that the qualitative data collected from interviews conducted in Phases I and III were rich and descriptive. All interviews were recorded and verbatim transcripts prepared. Respondent validation was utilized for the interview

phases of the study. This involved preparing a written summary report for each set of interviews, including themes and corresponding respondent quotations. This written summary was sent to all interview participants (n=29) (see Appendix U for a sample), seeking affirmation of the findings. Overall, affirmations of the thematic findings were received from 11 individuals including 5 librarians, 3 enrollment/retention officers, and 3 undergraduate students. No responses were received from the other 18 interviewees.

Validity of the quantitative survey was strengthened by using a randomly selected sample of undergraduates students enrolled in three universities in the United States. Content validity of the survey instrument was further addressed by using pre-developed and tested constructs and scale items from studies published by prominent researchers in the field. Subject matter experts, including doctoral committee advisory members and select doctoral students and candidates reviewed the survey instrument for both content validity and clarity. Finally, 13 undergraduate students field tested the survey instrument and provided feedback regarding clarity of questions.

In Phase IV, validity was addressed by using a randomly selected sample of 50 universities fitting a predetermined criteria set forth by the Carnegie Foundation (2015). Further, all websites were analyzed using a concrete, operationalized set of criteria that was developed by the researcher based upon study findings from Phase I through III. The design of this instrument allowed for a simple yes/no determination as to whether a website had the feature in question.

Stages of Mixing Data

While attending to validity and reliability concerns of each mono-method phase of the study is important, in mixed methods research it is also important to address where and how mixing occurred. In this study, data from Phase I qualitative interviews underwent thematic analysis and were also quantitized and compared to quantitative survey data from Phase II to better assess trends. Qualitative data from Phase I were also used developmentally to help construct the Phase II survey instrument. Both qualitative and quantitative data collected in Phases I and II were analyzed and used in the development of the Phase III undergraduate student interview protocol. Data from Phases I, II, and III were utilized to identify features to be included in the Phase IV library website feature analysis. Data collected from all four phases were then analyzed and compared as a whole in order to address the study's research questions.

Chapter Summary

A quantitative dominant four-phase sequential mixed methods design (Figure 4) that included six data collection instruments was used to explore the reasons that may underlie undergraduate students' underutilization of libraries and the ability of academic libraries to meet these needs. Data were collected from 1,291 participants representing three purposely selected large, public 4-year universities across the United States. A total of 29 participants (n=8 librarians, n=3 enrollment/retention officers, n=2 freshman pre-survey, and n=16 undergraduates post-survey) participated in one-on-one semi-structured interviews with the researcher. A total of 1,278 undergraduate students completed at least a portion of an online survey implemented at the three designated universities. Sixteen of

the aforementioned participants participated in both an interview and completed the online survey. Additionally, 50 randomly selected library websites were examined for the presence of key features, services, and tools desired by undergraduate students. Data triangulation for this study was strong, with each of the four research questions identified for the study having at least three separate data sources (see Appendix H for Research Crosswalk). All six data collection instruments underwent rigorous review to ensure validity and reliability. Data analysis included a mix of both qualitative, thematic analysis, and quantitative statistical analysis that included both descriptive and inferential statistics including stepwise multiple regression analyses and ANOVAs. The findings of this data analysis are outlined in Chapter IV.

CHAPTER IV

RESULTS

Overview

The two-fold purpose of this study was (1) to better understand the factors relating to undergraduate student engagement/disengagement with the academic library and (2) to explore whether university libraries should expand their role beyond providing academic resources and services into more "real-life" areas that are important to the daily lives of undergraduate students and in support of the university goal of retention. Thus, this study sought to answer four primary research questions and assess the truth of 10 corresponding propositions. The results of the qualitative and quantitative data analyses relating to these research questions and propositions are described below. The study findings are presented under key headings that correspond to the research questions and propositions for this study. Results include quantitative, qualitative, and merged (quantitative and qualitative results) data where applicable.

Perception of Value is the Largest Motivational Factor for Library Use

To answer **Research Question 1** "What motivational variables best predict library utilization by undergraduate students?" and to explore the truth of **Proposition 1,** "Motivational variables are predictive of undergraduate student's utilization of academic library resources," qualitative data from librarian and undergraduate student interviews

and quantitative survey responses were analyzed as they related to library usage (in-person and online) and the three motivational variables identified for this study: undergraduate students' expectancies for success in using library resources, their perceptions of value of engaging with these resources, and their personal cost when using these resources. Overall, findings from stepwise multiple regression analyses suggest that perceptions of library value are predictive of undergraduate students' use of the physical library, while perceptions of both library value and cost hold predictive value for students' use of online library resource.

To begin, mean ratings were calculated for undergraduate students' frequency of visits to the academic library building (M=3.24, SD=1.16) and frequency of access of the library's online resources (M=2.61, SD=1.14) during the previous semester using a 5-point scale with corresponding labels (1=0 visits/semester, 2=< 5 times/semester, 3=1-3 times/month, 4=1-2 times/week, 5=3 or more visits/week). A review of frequency data suggests the vast majority (79.8%) of the students visited their library in-person at least one time per semester, but less than 3 times per week (less than 5 times/semester, n=296, 25.5%; 1-3 times/month, n=249, 21.4%, 1-2 times/week, n=382, 32.9%). Frequency data further suggest that undergraduate students used their online library resources less frequently than they used the library in-person, with nearly two-thirds of the respondents (62.8%) indicating they used these resources more than one time per semester but less than 1-2 times/week (less than 5 times/semester, n=387, 32.9%; 1 to 3 times/month, n=352, n=29.9%). These findings are further outlined in Table 6.

Table 6

Frequency of Library Use

	In-Person Library Use		Online Library Use	
Frequency of Visits	Frequency	Valid Percent (%)	Frequency	Valid Percent (%)
1 = 0 times/semester	69	5.9	199	16.9
2 = Less than 5 times/sem	296	25.5	387	32.9
3 = 1-3 times/month	249	21.4	352	29.9
4 = 1-2 times/week	382	32.9	149	12.7
5 = 3 or more times/week	165	14.2	90	7.6
Total	1161	100.0	1177	100.0

Mean ratings were also calculated for undergraduate students' expectancies for success (M=5.52, SD=1.27) when using library resources, perceptions of library value (M=4.75, SD=1.31), and perceptions of library cost (M=3.41, SD=1.44). These mean scores suggest undergraduate students expect to be successful in their online library searches, have an above average perception of value of the library's resources, and a slightly below average perception that using the library will bear a negative cost. These findings are further outlined in Table 7.

Table 7

Library Usage and Motivational Subscale Factors - Descriptive Statistics

Factor	N	Mean	Std Dev
Library Usage*			
In-Person	1161	3.24	1.155
Online	1177	2.61	1.135
Motivational Subscale Factors**			
Expectancies for Success	1023	5.52	1.268
Library Value	917	4.75	1.314
Library Cost	906	3.41	1.436

*Measured on a 5-point scale (1=0 visits during the semester … 5=3 or visits per week)
**Measured on a 7-point scale (1=strongly disagree/7=strongly agree)

Value of library space is a key factor for predicting in-person library use.

Mean scores for academic library usage and the three motivational factors were entered into two separate stepwise multiple regression analyses to determine which, if any, factors were predictive of In-Person and Online Library Use. A stepwise procedure was selected for this analysis to ascertain what combination of independent variables (expectancies for success, library value, and library cost) would best predict the dependent variables (in-person library use and online library usage). Using this stepwise procedure, predictor variables were entered into the equation one at a time. Rencher and Christensen (2012) explain that, "…after a variable has entered, the variables previously selected are reexamined to see if each still contributes a significant amount" (p. 244). The process is continued only if additional variables add any statistical significance to the regression equation.

To predict usage of the in-person library, "library value" was entered into the stepwise regression equation at Step 1 of the analysis and was significantly related to in-person library use ($F_{(1,857)}$=9.887, $p < .002$). The R^2 value was .011 (Adjusted R^2 = .010), indicating approximately 1.1% of the variance of "in-person library use" could be accounted for by perceptions of "library value." Neither "expectancies for success" (t= -.443, p > .05) nor "library cost" (t=-.390, p > .05) entered into the equation at Step 2 of the analysis. Thus, the regression equation for predicting "in-person library use" was:

Predicted In Person Library Use = 2.833 + (.095)(Library Value).

Though these findings suggest that perceptions of library value account for only a small percentage of the variance of "in-person library use," the qualitative findings from both the librarian and undergraduate student interviews lend strength to the suggestion that students value the physical library primarily for study space, and secondarily for access to technology equipment. In the librarian interviews, comments from 100% of the participants (n=8) suggested that students' use of the physical library is largely driven by a desire for space and access to computer technology. Further, half of the undergraduate student interviewees (n=9, 50.0%) noted that they value the physical library primarily as a place to study quietly or work collaboratively with peers, with 22.2% (n=4) noting that they also value the library as a place to access computers, printers, and other technology equipment. Librarian L6 (University 1) explained,

> Certainly, in the information arena, I think the value in the library still is in the space. I think they [undergraduate students] would say very positive things about the ability to be in the building for so many hours a day, to have computers available, to have comfortable seats, to have such a large space and different group rooms, and all the things. I think they would still largely say it's the physical space.

In further support of this finding, librarian L8 (University 2) noted,

> We ask questions in the library. We do these little pop-up polls and ask, "Why are you in the library?" and "What do you like about the library?" A lot of times it's because it lacks distractions that they might find other places, so they are sometimes coming in there to focus.

Likewise, comments from undergraduate student interviewees support the notion that the primary value of the physical library lies in its space, and secondly for the

availability of technology equipment. In response to the interview question, "*Have you used the library since you've been a student at this university?"* student PS6 (University 3) responded,

> I go to the library about once or twice a week … I mean, I try to take as much advantage of the library as I can. I use a lot of their printing services there just because it's cheaper … Or… If I'm studying for, like, exams and stuff, I'll go into one of the little private study or collab rooms and I'll just work on my own, just so I can get away from my dorm … it's just a good place for me to go and be able to get away from everything and sort of focus on the task at hand.

Similarly, student S2 (University 3) noted that while she uses the physical library occasionally as a place to find books, she largely views it as a place to get away and study quietly. In response to the interview questions, "*And when you did use the library, tell me more about this. Was it in person or was it online? What were you doing that related to the library?"* she responded,

> It was in person. A few times it has been for specific book sources. … Often I go for the technological side for printing or, most often, for scanning. I use the scanner a lot. And the third reason and probably the biggest reason I go there is just to study somewhere that's not my room. I've heard that that's best for you to do, to study in a place where you're not generally sleeping.

Attainment value is key factor for predicting online library use.

A stepwise multiple regression analysis was conducted to evaluate whether students' "expectancies for success" when using the library, "library value," and "library cost" were necessary to predict "online library use." All correlations were statistically significant at $p < .05$. The prediction model contained two predictors (library value and library cost) and was reached in two steps with no variables removed. The model was

statistically significant ($F_{(2,869)} = 113.021$, $p < .001$) and accounted for approximately 20% of the variance of "online library use" ($R^2 = .206$, Adjusted $R^2 = .205$). Online library use was primarily predicted by higher levels of "library value" and lower values of "library cost." "Expectancies for success" (t=1.250, p =.212) did not enter into the equation at Step 2 of the analysis. Thus, the regression equation for predicting "online library use" was:

Predicted Online Library Use = .809 + .353(LibraryValue) - .064(LibCost).

Student interview responses to questions about their prior success in using online library resources as well as their expectations for future success suggest that undergraduate students are confident in their abilities to use these resources, thus expectations for success do not seem to be a key factor in their decisions about whether they will use the library's online resources for their academic information searching. Overall, qualitative analysis of student interview data suggests that these participants have been successful in previous attempts at using the library's resources (n=10, 55.6%) and expect to be successful on future occasions (n=15, 83.3%). Student interviewees' comments that are representative of the majority of the participants' sentiments include, "*I've had great success finding stuff [using the library resources]*" (S1, University 3), "*I've always found what I needed to find*" (PS2, University 2), and "*Pretty often I can find what I need*" (PS11, University 1).

It is worthwhile to note that the majority of librarian interviewees (62.5%, n=5) perceived that many undergraduate students approach their library online searching

experiences with confidence. However, findings from the thematic analysis of this set of data suggest that the confidence of many students quickly wanes as they experience frustration when they realize that library searching is not going to be a “Google-like” experience. Often this frustration seems to stem from issues that are technical in nature; other times it is conceptually related to developing the right research questions or identifying keywords for their online searches. Librarian L1 (University 1) explained,

> I think that they do [expect to be successful in finding what they need when they are required to use the library]. … But something that comes up with these expectations is that I do think there is a Google kind of expectation where you put in what you want and you find stuff. And most of the time with Google that works and you find the kind of stuff that you're looking for … I think they expect library resources to be like that and there is some frustration when they don't work quite the same way.

Further analysis of the qualitative data collected from both the librarian and undergraduate student interviews suggests that value of online resources is largely attributed to the attainment value, or the importance of doing well on a task (Schunk et al., 2008), that using the library holds. In other words, undergraduate students are largely extrinsically motivated to use online library resources when required by the professor, for not doing so would comprise their grades. Librarian L3 (University 3) explained,

> They typically will use the eResources when they are told to or when they are required to do so or after some experience they learned that eResources are indeed the best, most efficient source to use and the sources that resulted in them pulling the best grade. So, with motivation from faculty, if the project description says, "Use this database, use these resources," if you don't use these resources your grade will probably be low.

Librarian L1 (University 1) further noted,

> I think that motivation usually comes from encouragement or requirement by a faculty member that students use a specific type of resource. So, I think that's a big one. Yeah. I think that's really the primary thing. ... Especially with lower level students who I work with, they are not necessarily wanting to use this on their own.

Likewise, comments from half of the undergraduate students interviewed (n=9, 50.0%) suggest that for many students the primary motivator underlying their use of online library resources is course imposed requirements. PS11 (University 1) explained,

> … most of the time it's the professor wants you to have a specific kind of source, you know, something that has been published in a journal or a magazine or something. Well, a couple of times I have just kind of known that was the best place to go for that sort of stuff, but most of the time it's the professor.

Lending further support to these findings, PS9 (University 1) noted, "*Yes, that one [online library databases] I have used, but usually when it is required... like I'm required to look up research material through a database."*

Findings from a thematic analysis of student interview data suggest that many undergraduate students (n=12, 66.7%) will select Google as their preferred information resource when they are **not** required to use the library's online resources to complete their course assignments. Student interview comments suggest Google is valued over the library for its convenience, familiarity, and ease of use. In response to a question regarding why many students gravitate towards Google over the library for their academic information seeking, student PS12 (University 2) explained,

> Oh, because it is easier. I mean, I think that's it. I feel like they understand it right away or maybe even they've been using Google since, I don't know, how long ... basically their entire life ... They're making it easier so people can just understand and get it right away. Whereas, obviously a lot of universities' search engines and resources are not going to be like Google exactly. So, you just need to learn how to use and then figure it out. But, I don't feel like people always want to use it because it might be considered harder.

Similarly, student PS8 (University1) mused,

> Yeah. I think kids our age or like the generation know how to search for stuff on their own, just having been growing up with it. It doesn't mean that library databases are obsolete or anything, but I just think it is easier and more innate to people our age to just find answers on their own and know where to look. … if you just can find stuff online on your own really quickly or it's easier to just to search online on your own, there's really no use going to the library just to search more.

Group differences are present with respect to use of library resources.

To assess the truth of **Proposition 2,** "Group differences exist among undergraduate students with respect to their utilization of academic library resources," one-way ANOVAs and post hoc comparisons (where applicable) were conducted to determine if and where group differences exist for both in-person and online library usage. Demographic factors assessed include university, first generation student, attendance at a library instruction class, gender, race, academic major, GPA, family income, parent's education, and language spoken at home. Group differences for age, enrollment status, and international student status were not calculated, as the sample sizes in these groups fell below the minimum power threshold (0.80) previously calculated a priori using a G*Power analysis. Additionally, group differences with respect to race were analyzed only for White (Caucasian), Black/African American, and Asian/Native

Hawaiian/Pacific Islander groups, as the sample sizes in the other racial subgroups for this study (White (Hispanic/Latino), American Indian/Alaskan Native, and Two or More Races) were too small to yield reliable results. Statistical findings suggest group differences do, indeed, exist for undergraduate students with respect to their frequency of use of the library in-person and online, particularly related to attendance at a library instruction session, race, family income, and academic major. Significant ANOVA findings are reported below.

Statistical analysis of the quantitative survey data suggest that prior attendance at a library instruction session may be an important factor in a student's frequency of using either the library's in-person or online resources. Findings from one-way ANOVA analysis suggest frequency of in-person library visits differed significantly, though with a small effect, based upon whether a student attended 0, 1, or 2 or more library instruction sessions ($F_{(2,1133)} = 7.601$, $p = .001$, $\eta_p^2 = .013$). LSD post hoc analysis indicated that undergraduate students who had attended two or more library information literacy sessions visited the library in-person significantly more often than those who had attended one library class ($p = .032$) or no classes ($p < .001$).

Similarly, while the overall trends in data suggest that students will gravitate towards Google over the library if given the choice, Welch's adjusted one-way ANOVA analysis revealed that undergraduate students' use of online library resources varied significantly, with a moderate effect size, depending upon whether a student had attended 0, 1, or 2 or more library instruction classes ($F_{(2,613.962)} = 31.646$, $p < .001$, $\eta_p^2 = .051$). (The assumption of homogeneity of variance was violated for this factor, thus Welch's *F*-

ratio is reported.) Games-Howell post-hoc comparisons across groups indicated that undergraduate students who had attended two or more library information literacy sessions utilized the library's online resources significantly more often than those who had attended one library class ($p < .001$) or no classes ($p < .001$). Individuals who had attended one library information literacy session were also significantly more likely to utilize the library's online resources than those who had not attended a session ($p = .003$). One student interviewee, PS12 (University 2), who noted that she had attended two or more library information sessions, explained,

> Well, in the beginning we were required to for my courses just because as we've been told, Google obviously is not going to be giving you scholarly or credible sources and they're just saying, you know, if you are going to be writing research in the future, you should be using credible sources and resources, and so ... In the beginning it was just kind of a training thing and now most of the time if I'm, like, writing research papers for a class, I guess go to the library … Well I guess just because I've always been told that's where it's... you know, the more credible source. Having a library database... The library is full of research and put those articles out there and I guess ever since high school teachers have told me, "Don't just Google it. Don't just do this. You're not going to be finding credible sources."

Findings from one-way ANOVA tests also revealed that significant differences among racial groups exist, though with a small effect, with respect to both in-person ($F_{(2, 711)} = 11.429$, $p < .001$, $\eta_p^2 = .031$) and online library usage ($F_{(2,720)} = 7.467$, $p = .001$, $\eta_p^2 = .020$). Only data representing students who reported their race as White (Caucasian), Asian/Native Hawaiian/Pacific Islander, and Black/African American were included in this analysis. LSD post hoc comparisons revealed that Black/African American students ($p < .001$) and Asian/Native Hawaiian/Pacific Islander students ($p < .001$) visited the library in-person with significantly greater frequency than did their White (Caucasian)

peers. Similarly, LSD analysis revealed that Black/African American students utilized the online library resources significantly more often than did White (Caucasian) ($p < .001$) and Asian/Native Hawaiian/Pacific Islander ($p = .004$) students.

Using ANOVA analysis, a significant group difference was also noted between first generation and non-first generation students, though with a small effect size ($F_{(1,1162)} = 24.087$, $p < .001$, $\eta_p^2 = .020$) with first generation students using the online library resources with significantly greater frequency than non-first generation students. Likewise, Welch's adjusted one-way ANOVA analysis revealed a significant group difference among family income groups with respect to use of library online resources, with a small effect size ($F_{(4,333.764)} = 6.466$, $p < .001$, $\eta_p^2 = .027$). (The assumption of homogeneity of variance was violated for this factor, thus the Welch *F*-ratio is reported.) Games-Howell post-hoc comparisons across income groups revealed that students who reported their family incomes to be $20,000 - $34,999/year utilized the library's online resources significantly more often than those who reported their family incomes as $100,000/year or above ($p = .006$).

Finally, Welch's adjusted one-way ANOVA analysis revealed significant group differences among academic majors, though with a small effect size, with respect to their frequency of use of library online resources ($F_{(4,333.764)} = 6.466$, $p < .001$, $\eta_p^2 = .035$). (The assumption of homogeneity of variance was violated for this factor, thus the Welch *F*-ratio is reported.) Games-Howell post-hoc analysis revealed that Arts/Humanities majors reported utilizing the library's online library resources with significantly greater frequency than did students in STEM ($p < .001$) or Business ($p < .001$) related majors.

Likewise, students majoring in Social Sciences utilized online library resources with significantly greater frequency than those majoring in Business (p =.014) or STEM related fields (p =.027).

Students Need Information Related to Campus Environments and Assignments

To answer **Research Question 2**, "What are the social cognitive needs of successful students?" librarians, university enrollment and retention officials, and undergraduate students responded to a series of interview questions relating to what types of everyday life and academic information students need in order to thrive and be successful at their universities. Findings suggest that the most pressing everyday life information needs of university students relate to understanding what services are available to them and knowing how to navigate the campus infrastructure. From an academic standpoint, findings suggest undergraduate students not only require information to complete their academic research/writing assignments, but frequently seek information from online resources to help them complete their regularly assigned homework.

Students need information about navigating campus services.

Everyday life information seeking consists of collecting materials to help answer information needs that arise during the course of one's daily life (Savolainen, 1995). There was general consensus among the three types of interview participants (enrollment and retention officers, n=3, 100%; librarians, n=5, 62.5%; undergraduate students, n=6, 33.3%) that students may benefit from more information about how to navigate their environments, including campus services and university infrastructure. One enrollment

and retention official, R2 (University 1) explained, "*Well, the life information that they need is really how to transact business, and I'm not just referring to financial, with the university. What's our culture...? What's our structure...?"* Going into further detail, R1 (University 2) elaborated,

> I think the biggest thing is maybe understanding the ... campus resources and how to contact them. … Being able to find, like, the right resource or the right thing. So, if I have test anxiety or if I don't know how to take notes or if I am having difficulty with reading comprehension or if it understanding microeconomics theory specifically, like ... I think being able to adequately assess what it is that they are needing support in and who to go to for that, is a big thing too.

Along a similar vein, librarians noted that many students have directional and navigational information needs related to their everyday lives on a university campus. Librarian L5 (University 1) noted,

> I would say that a lot of them, in my perspective, have on their minds ... you know... time management, thinking through transportation issues, trying to figure out institution level access, like, How am I going to get to financial aid and back to class and where's this office and where's that office?

Findings from a thematic analysis of student interviewee data further suggest that many students may be unaware of the support services that are available to them and others are confused as to how to navigate the bureaucracy of higher education. Freshman student S2 (University 3) explained that one of the most stressful things she has encountered since arriving at the university has been trying to understand what resources are available to her and how to access them. She explained,

> I think a big thing for me was I didn't know where a lot of stuff was as far as the more helpful stuff that was available to you. Like no one ever told me where the speaking and writing center was. I never got, you know, a tour of the library or anything like that. I think, you know, stuff along those lines would be helpful (S2).

Similarly, sophomore student PS16 (University 1) noted that one of the most stressful things for her has been,

> Probably trying to navigate the bureaucracy of things at the university. Like, if I have an issue and I don't really know who I need to talk to, it takes like days for me to actually end up getting the problem solved because it takes so long. I end up just bouncing around between different offices.

Students need information to complete course assignments.

From an academic standpoint, information needs are largely centered on the information students require to complete both their course research papers and regularly assigned homework. Librarians (n=8, 100%) recognize that students need information about how to find and evaluate resources for their academic research projects. Librarian L7 (University 2) explained,

> I think... not necessarily unique to this institution, but I think in some ways I think that might be emphasized a little bit more here, is located in the understanding the purpose of scholarly research, scholarly articles, just scholarly materials in general. I think that for many students and I work particularly with first year students you know, this may be something they haven't encountered before and now they're coming in and it is expected that they understand the role of this type of scholarship and how they should be engaging with it.

Likewise, librarian L1 noted,

> So, a lot of students that I work with, especially in first year classes, are asked to find reliable or credible sources for the purpose of a speech or a research paper. In some classes, specifically English Composition, they are more likely to be asked to find scholarly sources.

While librarians noted that students need to learn how to find and evaluate information for their course research papers and speeches, students emphasized that they spend a lot of time finding practical information, not necessarily associated with traditional academic research, to help them complete their homework assignments. Students' responses to interview questions about the most common types of information they look up related to their course work varied. S1 (University 3) noted that he looks up a lot of material related to biology or psychology, "*I would say probably a lot of definitions of words … that would be a big one ... a lot of kind of historical facts ... names and dates and specific things*." PS1 (University 2) noted that much of what he researches online relates to his political science coursework. He explained,

> For the classes I'm in right now, lots of politically charged questions. I have to look up lots of things like (inaudible) production, GDP, public policy, for my global studies classes I have to ... Every week we talk about different issues that affect the world like poverty and globalization and things like that. So it's all like very... sometimes current events related and sometimes global issues kind of related stuff (PS1).

Finally, PS9 (University 1) noted that he needs a variety of information that is available online to complete his coursework. He explained that he looks up

> … a lot of translation stuff for Russian. And then, with a lot of my criminology courses it is a lot of looking up, like, statistics on US crime rates and demographics and comparing that against international statistics on the same subjects (PS9).

Top educational barriers include issues with time management and finances.

Closely related to academic and everyday life information needs, potential barriers to students' academic success warrant consideration. These barriers could conceivably be considered information needs (either everyday life or academic) if not properly addressed. Thus, to ascertain the truth to **Proposition 3** "There are common educational barriers among undergraduate students," survey participants were presented a list of 20 potential educational barriers and asked to rate, on a 7-point scale, the likelihood that they would encounter each barrier while enrolled at the university. In addition, librarians, enrollment and retention officers, and undergraduate student interview participants were asked to respond to questions relating to the greatest stressors they perceive undergraduate students encounter. Interview participants were also asked to speculate about the key reasons they believe some students drop out of their universities.

Of the four Educational Barriers subscales identified for this study, undergraduate students feel that they are most likely to encounter feeling Underprepared to Manage Academic Rigor (M=3.96, SD=1.58) and issues related to Finances (M= 3.93, SD=1.69). Lower subscale means for issues related to Lack of Support from Others (M=2.61, SD=1.31) and Social Belonging/Mental Health (M=3.55, SD=1.65) suggest undergraduate students expect that they are less likely to encounter these challenges.

Particularly noteworthy among the individual scale items of the four subscales, Money Problems (M=4.71, SD=2.05) and Difficulty Managing Time (M=4.74, SD=1.91) ranked at the top of the potential barriers list. Both qualitative and quantitative results also suggest many students expect to encounter feelings of "not being prepared enough" or "not knowing how to study well" (M=3.93, SD=2.02), while others anticipate struggles with "loneliness" (M=3.81, SD=2.14), "not fitting in" (M=3.06, SD=2.01), and "mental health issues" (M=3.74, SD=2.23). These findings are detailed in Table 8.

Table 8

Educational Barriers – Descriptive Statistics

Scale Item (Item #)	N	Mean	Std Dev
Lack of Support from Others Subscale	**817**	**2.61**	**1.31**
Neg family attitudes about college (27.4)	850	2.10	1.74
Lack of support from professors (27.6)	850	3.06	1.83
Lack of support from university staff (27.12)	854	2.98	1.86
Lack of support from friends to pursue ed goals (28.11)	835	2.46	1.74
Negative attitudes about gender (28.12)	838	2.49	1.82
Negative attitudes about race/ethnicity (28.13)	837	2.40	1.84
Lack of role models or mentors (28.16)	840	2.97	1.91
Financial Related Issues Subscale	**828**	**3.93**	**1.69**
Money problems (27.1)	853	4.71	2.05
Family problems re: money (27.2)	852	3.51	2.04
Lack of financial support (28.17)	836	3.58	2.16
Underprepared for Academic Rigor Subscale	**825**	**3.96**	**1.58**
Not smart enough (27.3)	854	3.78	2.02
Not being prepared enough (27.7)	850	3.92	1.94
Not knowing how to study well (27.8)	854	3.93	2.02
Difficulty managing my time (28.20)	840	4.74	1.91
Lack of motivation (28.30)	836	3.44	2.00
Social Belonging/Mental Health Difficulties Subscale	**821**	**3.55**	**1.65**
Not fitting in at college (27.5)	849	3.06	2.01
Loneliness (27.10)	847	3.81	2.14
Mental health issues (e.g., depression or anxiety) (27.11)	850	3.74	2.23
Relationship concerns (28.14)	835	3.60	2.03

Difficulties managing time is a common challenge for undergraduate students.

Findings from a thematic analysis of interview data further corroborate the quantitative findings which suggest time management is a challenge for undergraduate students (librarians, n=7, 87.5%; enrollment and retention officers, n=3, 100%; and undergraduate students, n=10, 55.6%). As students transition to independent living for the first time, learning to manage their time can be particularly challenging. Librarian L2 (University 3) explained,

> I think probably time management is a concern and just, you know, kind of the whole idea of suddenly being solely responsible for, you know, your own time and how you, you know, how they spend time doing various things. I think that is hard. I get the sense that a lot of students are doing that for the first time. You know, they've never really had to prioritize their time like they are being asked to do all of a sudden, so I think that's a really big thing.

Enrollment and retention officer, R1 (University 2), also noted the difficulty students encounter when transitioning to the university and learning to manage their time. She explained,

> So then they come into this campus and for the first time they have to learn how to study and they have to learn how to manage their time and they have to learn ... the importance of class attendance. … basic things like sleep hygiene and eating healthy and making exercise and club involvement and just balancing their time, I think is a huge stressor for students (R1).

Senior student, PS5 (University 3), explained how easy it can be to become distracted with respect to time. She recalled,

> I came here my freshman year and everybody told me, "Oh, college is so hard, so different." And I just don't think it starts off that way. Like, when I ... was in high

> school and when I came to college I had less time in class and I was no longer working and I had a lot of free time and the people I was around also had that, and we took that as meaning it was easier. And so, by meaning it was easier, we just spent less time doing it and then kind of like slipped into like a place of... just kind of like failing classes without knowing it. Because, it was like, "Well I have plenty of time" and then you get so comfortable in a place that you forget…(PS5).

Another senior student, PS11 (University 1), further explained,

> I didn't feel like I couldn't keep up or the information was particularly hard [when I first started out as a freshman], but the format took me a little while where you would show up for a lecture and then all homework and stuff was done on your own time and there was lots more kind of personal responsibility for figuring out assignments and stuff.

Issues related to finances are commonplace for undergraduate students.

Findings from qualitative analysis of the interview data from librarians (n=4, 50.0%), enrollment and retention officers (n=3, 100%), and undergraduate students (n=4, 22.2%) lend further credence to the quantitative findings that suggest financial issues are common for many students and, when unmet, can potentially lead to student drop-out.

Enrollment and retention officer, R3 (University 3), explained,

> I think finance plays a large role with a lot, depending on the student you're talking about. We're 50% Pell. … [B]ut it's outside of the financial aid. Financial aid is covering their tuition and fees and room and board, close enough for room and board. But, there are still the pressures of being a poor student in the outside world. … So, finances are always on their minds somewhere in this equation.

Enrollment and retention officer, R1 (University 2), further explained,

> For my students in particular, our financial resources are really critical for them. … So understanding how to find the job that they are looking for and how to

> apply and then how to put together an application package and who to contact about that...

Librarians also noted the practical challenges faced by students related to their finances. Librarian L1 (University 3) explained,

> One other big thing that I hear a lot about is financial stress, trying to find a job, especially for incoming freshman, to be really stressful. … I know that financial issues are a huge reason ... so... no longer being eligible for financial aid is a big reason that we lose some students.

Undergraduate students also recognized the challenges many students face with regard to their finances, including financial aid. S2 (University 3) noted that her freshman roommate dropped out of the university because, *"She did not do well in her classes and she failed four of them and so her financial aid didn't go through and she could not afford to go here."* Likewise, freshman student, PS14 (University 3), acknowledged the harsh learning curve that many students experience with regard to their financial aid. A friend of hers dropped out of the university because he lost his financial aid. She explained,

> What I've heard from other people is they try and take like 15 credits or something so if you drop one class you are still a full time. So, he was taking 12 credits and I think he dropped a lab, failed out of the lab or something, so he just lost [his financial aid] (PS14).

Many students feel underprepared for rigors of university coursework.

Findings from analysis of the quantitative survey and qualitative interview data (student interviews, n=12, 66.7%, librarians, n=3, 37.5%; enrollment and retention

officers, n=2, 66.7%) also suggest that many undergraduate students feel underprepared for the rigors of academic coursework at their universities. Though survey responses to questions relating to "not being smart enough" (M=3.92, SD=1.94) and "not knowing how to study well" (M=3.93, SD=2.02) yielded average ratings, interview results suggest these issues may be paramount for many students. Sophomore interviewee, PS13 (University 3), explained,

> I feel like some of it I was prepared for, but there was others that... I don't know... Like science, I took an anatomy class and I was not prepared at all for that class. … I wasn't used to a class where you basically took four tests and that was your grade. So if you did terrible on one then you're kind of in trouble from the beginning. … After my first semester I got put on academic probation and I had to take a class so I figured out all of the little things that can help you and all that.

Freshman student, PS1 (University 2), further explained,

> It's a lot harder in college ... In high school you have lots of opportunities, you know, to get points in class, or if you had a bad exam or something there were other ways you could make up your grade. But, in college it's a lot more scarce - for some classes more than others. It's like very ... You have to perform at a high level constantly in some classes than ... I would have before.

Librarians have also noted that some students are not yet ready for university level academics. Librarian L8 (University 2) noted that, "*Some students can't cut it.*" Librarian L4 (University 3) further explained, *"[T]here are definitely barriers involved with academics and also with life and so I think some students need a lot more support and they need more support than our campus can provide at this point, the way things are set up*."

Many students feel that university life is a poor fit.

Closely related to feelings of being underprepared, findings from student (n=5, 27.8%) and enrollment and retention officer (n=2, 66.7%) interview data suggest that university study and the collegiate environment may not be the right fit for many students. For some, feelings of "poor fit" may stem from uncertainty or indecision about their academic majors or career paths. Undergraduate student, PS4 (University 1), explained that university study may seem to be a poor fit for some students, though with more in-depth advising, these individuals may be able to find their place and persist. She explained

> I think it was really like school wasn't their style and their parents saying, "Hey, you need to go to school. You have to go to school," but it wasn't what they wanted to do. … I think if they would have given them more options than just saying, "Hey, this might not be your major, but what if they would find something they would enjoy learning about rather than like gen ed's" (PS4).

Enrollment and retention officer, R1 (University 2), further explained that there are many factors that come into play for students who may be questioning if university study is the right fit for them. She explained,

> We have lots of students who have poor academic performance and really pull out of it and the ones who aren't doing that, oftentimes it's not adjusting those factors appropriately. And probably with a lot of them, it's that they are persisting towards a major that they don't seem to be demonstrating the strength in, so they just... particularly engineering. So, they continue to take STEM coursework and retake courses and do grade replacement and kind of be averse to the conversation about alternative plans and so ... We end up losing them because they haven't taken (inaudible) other options to consider on our campus (R1).

While some students question their academic fit with their major or university, others struggle with finding their "social fit" or developing a sense of social belonging. Freshman student, PS14 (University 3), described the challenges she faced trying to become involved in campus life. She explained, "*Socially I wasn't ready, but yeah... Like, they have that thing the first week of school on (inaudible) where they have all the clubs and you can sign up. But like, if you don't go to that then you don't really hear about any of the clubs*" (PS14). Similarly, sophomore student, PS4 (University 1), described her challenges in feeling connected on a large university campus. She noted,

> It was particularly difficult for me, just because I came from a town where I knew everybody and everybody knew me to a place where I knew absolutely not one single person and that was kind of hard to adjust to, you know, after 18 years of knowing people, so that was really hard for me (PS4).

Enrollment and retention officer, R2 (University 1), explained that a critical component of a student's success lies in his or her ability to find their social niche. She noted,

> [I]t's the ability to make the transition from being at home to being in college to engaging and feeling connected to the university and they actually fit in ... That they develop a circle of friends and that they begin to be engaged with their academic program. I think those students … are much more successful (R2).

R1 (University 2) further explained that finding one's social fit can be critical to their overall success. She noted, "*I think... especially on our campus I think a lot of what I see is just like social belongingness. You know, feeling like they belong at the university, that they have a niche that they fit in that...*" (R1).

Group differences exist with respect to academic barriers.

To assess the truth of **Proposition 4** "Group differences exist among undergraduate students with respect to their common educational barriers" one-way ANOVA and post hoc analyses were conducted for each of the four Educational Barriers subscales identified for this study: (1) Support from Others, (2) Financial Related Issues, (3) Academic Readiness, and (4) Social Belonging and Mental Health. Group differences were assessed for all demographic variables noted in this study, with the exception of age, enrollment status, and international student status which were not evaluated due to small sample sizes in some of the subgroups. Statistical findings suggest group differences do exist among undergraduate student groups with respect to the types of educational barriers they expect to encounter. Particularly noteworthy are group differences based upon race, family income, GPA, and academic major. Statistically significant ANOVA findings, including corresponding effect size (η_p^2) and power (1-β) are outlined in Table 9. While findings from many of the ANOVA tests support Proposition 4 that there are common educational barriers among student demographic groups, those with questionably high power (1-β = .9 or above) and extremely small effect sizes ($\eta_p^2 < .03$) suggest that, in these instances, the statistical test may have been overly sensitive and the significant mean differences may have resulted from the large sample sizes. Further details regarding all significant ANOVAs ($p < .05$) are discussed below.

Table 9

Potential Barriers to Educational Success – Significant ANOVAs*

Educational Barrier	*F*	Sig. (*p*)	Effect (η_p^2)	Power (1-β)
Support from Others Issues				
Race**	15.533	<.001	.057	1.00
GPA**	4.779	.003	.020	.935
Income**	2.900	.015	.023	.875
ESL	15.892	<.001	.019	.978
Financial Issues				
University	11.293	<.001	.027	.993
First Gen.	16.605	<.001	.020	.983
Race	12.198	<.001	.034	.996
Major	4.775	.001	.026	.954
GPA	15.280	<.001	.054	1.00
Fam Income	20.758	<.001	.136	1.00
Parent's Ed	7.967	<.001	.049	1.00
Academic Readiness Issues				
Race**	6.822	<.001	.022	.956
GPA	29.981	<.001	.101	1.00
Soc Belong/Mental Hlth Issues				
Major	5.550	<.001	.030	.978

*Only demographic variables with statistically significant ANOVAs are listed.
** Welch's adjusted *F*-ratio reported due to violations of ANOVA assumption of homogeneity of variance.

"Support from others" varies depending upon race, income, GPA, and language.

Statistical analysis of the quantitative survey data revealed that students' perceptions of feeling "supported from others" varies according to their race, family income, GPA, and language spoken at home. In particular, Welch's adjusted one-way ANOVA results revealed that a significant group difference was present among racial groups, with a moderate effect size, as it relates to feeling supported by others ($F_{(2,140.587)} = 15.533$, $p < .001$, $\eta_p^2 = .057$). (Assumptions of homogeneity of variance were violated

for race groups, thus Welch's adjusted *F*-ratio is reported.) Games-Howell post hoc comparisons suggest White (Caucasian) students feel significantly more supported by others than do Black/African American students ($p < .001$) and Asian/Native Hawaiian/Pacific Islander students ($p < .001$). Though not entered into the ANOVA calculations due to small sample size, the mean rating for White (Spanish, Hispanic, Latino) students (n=53, M=2.91, SD=1.36) relating to "support from others" was also noticeably higher than that identified for White (Caucasian) students (n=488, M=2.36, SD=1.15).

Welch's adjusted one-way ANOVA analyses also revealed that students with higher GPAs felt significantly more "supported by others" than their peers who reported lower GPAs, though with a small effect size ($F_{(3,185.498)} = 4.779$, $p = .003$, $\eta_p^2 = .020$). (Assumptions of homogeneity of variance were violated across GPA groups for this factor, thus Welch's adjusted *F*-ratio is reported.) Games-Howell post hoc comparisons revealed that students reporting a GPA of 3.6 – 4.0 reported feeling significantly more supported than those who reported GPAs of 2.6 – 3.0 ($p = .021$) or 2.5 or below ($p = .039$).

ANOVA analyses further revealed that significant group differences were present among reported family income groups with respect to feeling "supported by others," though with a small effect size ($F_{(5,246.155)} = 2.900$, $p = .015$, $\eta_p^2 = .023$). (Assumptions of homogeneity of variance were violated across income groups for this factor, thus Welch's adjusted *F*-ratio is reported.) Games-Howell post hoc comparisons revealed that students in the highest income group ($100,000/year or above) felt significantly more supported

by others than their peers who reported their family incomes to be $35,000 - $49,999 ($p$ =.018). Finally, ANOVA analysis revealed that students who speak English as the primary language in their homes reported that they felt "supported by others" to a significantly greater degree than the students who speak a language other than English in their homes, though with a very small effect size ($F_{(1,811x)} = 15.892$, $p < .001$, $\eta_p^2 = .019$).

Anticipation of "financial issues" varies among many demographic groups.

Students' expectations that they will experience "financial issues" also varied significantly based upon a variety of demographic factors including family income, parent's education, GPA, university, first generation college student status, race, and academic major. Not surprisingly, ANOVA analysis revealed that perceptions of "financial issues" differed significantly based upon students' reported family income, with a large effect size ($F_{(5,657)} = 20.758$, $p < .001$, $\eta_p^2 = .136$). LSD post hoc analysis revealed that students from families in the highest income group ($100,000/year or above) reported that they anticipated "financial issues" to a significantly lower degree than did their peers in all other income groups (less than $20,000/year, $p < .001$; $20,000 - $34,999/year, $p < .001$; $35,000 - $49,999/year, $p < .001$; $50,000 - $74,999/year, $p < .001$; $75,000 - $99,999/year, $p = .022$). Likewise, students from families in the second highest income group ($75,000 - $99,999) reported that they anticipated "financial issues" to a significantly lesser degree than their peers in all other lower income groups (less than $20,000/year, $p < .001$; $20,000 - $34,999/year, $p < .001$; $35,000 - $49,999/year, $p < .001$; $50,000 - $74,999/year, $p < .002$). Finally, those in the middle income group ($50,000 - $74,999/year) reported that they anticipated "financial issues" at

a significantly lower degree than their peers with family incomes of less than $20,000/year ($p$ =.002).

Perhaps closely associated to family income, one-way ANOVA analysis revealed that students' expectations that they will encounter "financial issues" also differed significantly based upon their parents' highest level of education, with a small to moderate effect size ($F_{(5,765)} = 7.967$, $p < .001$, $\eta_p^2 = .049$). LSD post hoc comparisons revealed that students whose parents held an associate's degree or below were significantly more likely to anticipate "financial issues" than those for whom their parents' highest level of education was a bachelor's degree or above. More specifically, students whose parents' highest level of education was a high school diploma or equivalent were significantly more likely to anticipate "financial issues" than students whose parents who held master's (p =.003) or doctoral level degrees ($p < .001$). Similarly, students whose parents attended some college but did not earn a degree were also significantly more likely to anticipate "financial issues" than students whose parents earned a bachelor's (p =.031), master's ($p < .001$), or doctoral degree ($p < .001$). Individuals whose parent's earned an associate's degree were significantly more likely to anticipate "financial issues" than those whose parents earned master's (p =.038) or doctoral degrees (p =.002). Finally, students whose parents earned a bachelor's degree were significantly more likely to anticipate "financial issues" than those whose parents had earned a master's ($p < .003$) or doctoral degree ($p < .001$).

One-way ANOVAs also revealed significant group differences among student GPA groups with respect to their expectation that they will encounter "financial issues,"

with a small to moderate effect size ($F_{(3,807)} = 15.280$, $p < .001$, $\eta_p^2 = .054$). LSD post hoc analysis revealed that students reporting high GPAs were significantly less likely to anticipate "financial issues" than their peers with lower GPAs. More specifically, students reporting a GPA of 3.6-4.0 were significantly less likely to anticipate "financial issues" than students in all lower GPA reporting groups (2.5 or below, $p < 001$; 2.6-3.0, $p < .001$; 3.1-3.5, $p = .012$). Similarly, students reporting a GPA of 3.1-3.5 were significantly less likely to anticipate "financial issues" than those reporting lower GPAs (2.5 or below, $p < .001$; 2.6-3.0, $p = .003$).

One-way ANOVA analysis further revealed that students' anticipation that they will experience "financial issues" differed significantly based upon their university affiliation, though with a small effect size ($F_{(2,825)} = 11.293$, $p < .001$, $\eta_p^2 = .027$). LSD post hoc comparisons revealed that students enrolled at both University 1 ($p = .010$) and University 3 ($p < .001$) were significantly more likely to anticipate "financial issues" than students enrolled at University 2.

Findings from one-way ANOVA analysis further suggest that students in different racial groups differed significantly with respect to their anticipation of "financial issues," with a small effect size ($F_{(2,700)} = 12.198$, $p < .001$, $\eta_p^2 = .034$). LSD post hoc analysis revealed that Black/African American students expected to encounter "financial issues" to a significantly greater degree than White (Caucasian) ($p < .001$) and Asian/Native Hawaiian/Pacific Islander students ($p < .001$). While not included in the ANOVA calculations due to small sample size, the mean rating for White (Spanish, Hispanic, Latino) students (n=54, M=4.27, SD=1.72) with respect to anticipating financial issues

was also noticeably higher than that identified for White (Caucasian) students (n=492, M=3.45, SD=1.62). Likewise, first generation students reported that they anticipated "financial issues" to a significantly greater degree than did non-first generation students, though with a very small effect size ($F_{(1,816)} = 16.605$, $p < .001$, $\eta_p^2 = .020$).

Finally, one-way ANOVA analysis revealed significant group differences among academic majors with respect to their anticipation of "financial issues" ($F_{(4,714)} = 4.775$, $p = .001$, $\eta_p^2 = .026$), though with a small effect size. LSD post hoc comparisons suggest that students pursuing STEM majors expected to encounter "financial issues" to a significantly lesser degree than students majoring in Arts/Humanities ($p = .002$), Social Sciences ($p = .021$), and Health related fields ($p = .024$). Likewise, students pursuing Business related majors anticipated "financial issues" to a significantly lesser degree than those majoring in Arts/Humanities ($p = .001$), Social Sciences ($p = .009$), and Health related fields ($p = .01$).

"Academic readiness" varies depending upon GPA and race.

One-way ANOVA analyses were conducted across demographic variables with respect to students' anticipation that they would encounter issues related to their "academic readiness." Overall findings suggest that significant group differences exist for this measure across GPA groups, with a large effect size ($F_{(3,804)} = 29.981$, $p < .001$, $\eta_p^2 = .101$), and race groups (as reported by Welch's adjusted F-ratio due to violations of homogeneity), with a small effect size ($F_{(2,147.023)} = 6.822$, $p = .001$, $\eta_p^2 = .001$). More specifically, LSD post hoc comparisons revealed that students with GPAs of 3.6-4.0 were significantly less likely to anticipate issues related to their "academic readiness" than

their peers in all lower GPA groups (2.5 or below, $p < .001$; 2.6-3.0, $p < .001$; 3.1-3.5, $p < .001$). Likewise, students in the second highest GPA group, 3.1-3.5, reported that they anticipated issues related to their "academic readiness" to a significantly lesser degree than students in the lower GPA groups (2.5 or below, $p = .002$; 2.6-3.0, $p < .001$). With respect to race, findings from Games-Howell post hoc analyses suggest White (Caucasian) students anticipated fewer issues related to their "academic readiness" than their Black/African American ($p = .008$) and Asian/Native Hawaiian/Pacific Islander peers ($p = .037$). Though White (Spanish, Hispanic, Latino) students were not entered in the ANOVA calculations due to small sample size, the mean ratings for this racial subgroup (n=53, M=4.24, SD=1.77) suggest these students also anticipated more issues relating to their academic readiness than White (Caucasian) students (n=494, M=3.77, SD=1.51).

"Social belonging" varies according to academic major.

Finally, one-way ANOVA analyses were conducted across demographic variables with respect to students' expectations that they will encounter issues related to their "social belonging." The only statistically significant finding revealed from this analysis related to academic major, with a small effect size ($F_{(4,710)} = 5.550$, $p < .001$, $\eta_p^2 = .030$). More specifically, LSD post hoc analysis revealed that students pursuing Business majors anticipated significantly fewer issues related to "social belonging" than did their peers majoring in Arts/Humanities ($p < .001$), Social Sciences ($p = .005$), and STEM ($p = .006$). Further, students majoring in STEM and Health related fields anticipated significantly

fewer barriers related to "social belonging" than their peers majoring Arts/Humanities (STEM, p =.006; Health, p =.002).

Social cognitive factors and educational barriers are predictive of online library use.

To assess the truth of **Proposition 5**, "Undergraduate students' contextual background and social cognitive factors are predictive of their utilization of academic library resources" mean scores were calculated for educational barriers and social cognitive factors and then entered into stepwise multiple regression analyses in order to predict both in-person and online use of the academic library. Mean ratings for the educational barriers subscales suggest students anticipate near average levels of issues related to their finances (M=3.93, SD=1.69) and feeling underprepared for the academic rigor of university study (M=3.96, SD=1.58), with below average expectations that they will experience challenges related to their social belonging/mental health (M=3.55, SD=1.65) and feeling supported by others (M=2.61, SD=1.31). SCCT factors including academic self-efficacy (M=6.40, SD=0.95), outcome expectations (M=6.02, SD=1.09), and performance goals (M=5.50, SD=1.65) were also entered into the regression analyses. Each of these SCCT factors received above average ratings on a 7-point scale, suggesting students, in the aggregate, are determined to persist in their studies and graduate (performance goals), anticipate that their persistence through graduation will have positive consequences for achieving their future career or academic goals (outcome expectations), and are confident that they will be successful in their academic work (academic self-efficacy). Descriptive statistics for the SCCT factors are outlined in Table 10. (See Table 8 for descriptive statistics relating to educational barriers).

Table 10

Social Cognitive Career Theory Factors – Descriptive Statistics

Subscale Factor	N	Mean	Std Dev
Social Cognitive Career Theory Factors			
Performance Goals	873	5.50	1.65
Outcome Expectations	848	6.02	1.09
Academic Self-Efficacy	733	6.40	0.95

The four educational barriers subscale factors and the three SCCT factors were entered into the stepwise multiple regression analysis to predict in-person library use. No factors entered into the model at step 1 of the analysis, thus there was no statistically significant model for any of the variables, given the stepwise criteria (Probability-of-*F*-to-enter <= .050, Probability-of-*F*-to-remove >= .100). Thus, the truth of Proposition 5 with respect to in-person library use was found to be false.

Likewise, a step-wise regression analysis was conducted using the four educational barriers factors and three SCCT variables to predict online library use. The prediction model contained three predictors ("social belonging/mental health," "academic readiness," and "performance goals") and was reached in three steps. The model was statistically significant ($F_{(3,654)} = 4.812$, $p < .01$) and accounted for approximately 2% of the variance of online library use (R^2=.022, Adjusted R^2=.017). Thus, higher expectations of "social belonging/mental health issues," lower expectations of "academic readiness issues," and higher values of "performance goals" lead to higher values for Online Library Use. "Support from others" (t=1.928, p = .054), "financial issues" (t=.972, p = .332), "outcome expectations" (t=.020, p =.948), and "academic self-efficacy" (t=1.146,

p =.252) did not enter into the equation at Step 3 of the analysis. Thus, the regression equation for predicting Online Library Use is:

Predicted Online Library Use = 2.169 +.107(Social Belonging Issues) - .080(Academic Readiness Issues) + .062(Performance Goals)

Social cognitive factors and educational barriers are predictive of GPA range.

To assess the truth of **Proposition 6**, "Undergraduate students' contextual background and social cognitive factors are predictive of their overall academic success," the four educational barriers factors, "support from others," "financial issues,", "academic readiness," and "social belonging/mental health" (see Table 8) and the SCCT variables "performance goals," "outcome expectations," and "academic self-efficacy" (see Table 10) were entered into a stepwise multiple regression analysis to predict GPA. The prediction model contained five predictors (academic self-efficacy, outcome expectations, academic readiness issues, social belonging/mental health issues, and financial issues) and was reached in five steps. The model was statistically significant ($F_{(5,638)}$ = 36.707, p < .001) and accounted for approximately 22% of the variance of GPA (R^2=.223, Adjusted R^2=.217). Higher values of "academic self-efficacy," lower values for "outcome expectations," lower values for "academic readiness issues," higher values for "social belonging/mental issues" and lower values for "financial issues" were found to significantly predict higher GPA scores. "Support from others" (t=-.830, p =.407) and "performance goals" (t=-.907, p =.365) did not enter into the equation at Step 5 of the analysis. Thus, the regression equation for predicting Online Library Use was:

Predicted GPA = 1.929 + .409(Acad Self-Efficacy) - .161(Outcome Expectations) - .121(Academic Readiness Issues) + .093(Social Belonging Issues) - .075(Financial Issues)

Search Engines are Most Preferred Information Seeking Resource

To answer **Research Question 3**, "How do undergraduate students prefer to meet their information needs?" survey participants were provided with lists of different types of information resources and technology tools and asked to rate the frequency that they consult these resources first for everyday life information seeking and then again for academic/course related research using a 7-point Likert type scale (1=never/7=almost always). Additionally, librarians and undergraduate student interview participants responded to a series of questions relating to information resource and technology tool preferences for undergraduate students. Findings from the quantitative analysis of the survey data and the qualitative analysis of the interview data overwhelmingly suggest that Google is the top choice for both everyday life and academic information seeking. Preferences for technology tools, however, seem to differ depending upon whether an undergraduate student is conducting everyday life or academic research. These findings are discussed in further depth below.

Google is the preferred resource for everyday life and academic research.

To assess the truth of **Proposition 7**, "There are commonalities among undergraduate students with respect to the types of information resources they prefer to use for information seeking," survey participants were provided with a list of information resources and asked to rate the frequency that they consulted these resources for everyday life (23 items) and academic/course related research (25 items). Additionally, qualitative

data collected from librarian and undergraduate student interviews were analyzed for common trends related to information resource preferences. For both everyday life and academic information seeking, “Google or other Search Engines” received the highest overall rating based upon descriptive analysis of quantitative data. With respect to everyday life information seeking, the mean rating for “Google or other Search Engines” was 6.31 (SD=1.03), with 82.1% of the respondents rating this option as a “6” or “7 (almost always)” on a 7-point scale. This was followed by friends/family (M=5.30, SD=1.55, 53.6% rated as “6” or “7”), non-university websites (M=5.25, SD=1.62, 52.3% rated as “6” or “7”), smart phone browsers (M=5.10, SD=1.84, 51.8% rated as “6” or “7”), and Wikipedia (M=4.76, SD=1.80, 40.5% rated as “6” or “7”).

Likewise, survey participants rated “Google or other Search Engines” as the most frequently consulted resource for seeking information to complete their course-related assignments (M=6.02, SD=1.29), with 73.8% of respondents providing a rating of “6” or “7 (almost always).” Tied for second as the most frequently consulted information resources for course research were course readings (M=5.87, SD=1.27, 67.4% rated as “6” or “7”) and university websites (M=5.87, SD=1.27, 24.0% rated as “6” or “7”). Professors are another commonly consulted resource for academic information seeking (M=5.15, SD=1.55, 46.9% rating a “6” or “7), followed closely by non-university websites (M=4.90, SD=1.95, 47.3% rating a “6” or “7”), and library online databases (M=4.89, SD=1.97, 46.7% rated as “6” or “7”). Further details relating to the full list of both everyday life and course-related information resource preferences are outlined in Table 11.

Table 11

Information Resource Preferences for Everyday and Academic Information Seeking – Descriptive Statistics

	ELIS				Academic			
Information Resource	**N**	**Mean***	**Std Dev**	**Rated 6 or 7 (%)**	**N**	**Mean***	**Std Dev**	**Rated 6 or 7 (%)**
Google/Srch Eng	**956**	**6.31**	**1.033**	**82.1**	**904**	**6.02**	**1.285**	**73.8**
Family/Friends	**956**	**5.30**	**1.548**	**53.6**	904	3.60	1.857	18.8
Web (non univ)	**957**	**5.25**	**1.620**	**52.3**	**902**	**4.90**	**1.950**	**47.3**
Smtph Browser	**956**	**5.10**	**1.837**	**51.8**	903	3.84	2.124	25.5
Wikipedia	**955**	**4.76**	**1.798**	**40.5**	903	4.41	1.886	33.5
Classmates	959	4.72	1.617	35.2	903	4.43	1.844	32.0
Email	951	4.69	1.794	39.4	904	4.16	1.962	29.7
Text Messaging	953	4.66	1.875	38.0	903	2.93	1.932	12.1
Professors	958	4.48	1.644	28.9	**903**	**5.15**	**1.548**	**46.9**
University Web	955	4.01	1.840	22.8	**905**	**5.87**	**1.270**	**24.0**
Govt. Websites	957	3.78	1.798	18.6	902	4.26	1.935	30.9
Mobile Apps	954	3.75	1.941	21.9	905	2.66	1.855	10.3
Google Scholar	958	3.63	1.997	19.9	903	4.42	2.172	40.0
Personal Collect.	953	3.25	1.812	11.8	04	3.07	1.935	13.3
Television	954	3.22	1.881	14.4	899	2.20	1.619	4.7
Newspapers	954	3.11	1.795	11.1	901	2.86	1.845	10.0
Blogs	960	3.03	1.788	10.8	905	2.62	1.798	9.0
Library Databases	960	2.91	1.802	10.1	**908**	**4.89**	**1.971**	**46.7**
Library Books	954	2.77	1.760	8.6	899	3.23	2.006	16.9
Virt Agt (e.g. Siri)	956	2.71	1.852	10.5	903	2.17	1.699	6.7
Radio	953	2.55	1.731	7.4	903	1.95	1.508	4.3
Magazines	955	2.54	1.651	6.3	899	2.28	1.682	6.8
Librarians	953	2.46	1.632	5.8	898	2.68	1.857	10.0
Course Readings	--	--	--	--	**905**	**5.87**	**1.270**	**67.4**
Online Study Aid (e.g., Quizlet)	--	--	--	--	905	4.79	1.895	41.3

Analysis of qualitative data collected from interviews with librarians and undergraduate students further corroborate the findings which suggest that Google is the most preferred information resource, particularly relating to everyday life information

seeking (librarians, n=6, 75.0%; undergraduate students, n=16, 88.9%). Librarian L7 (University 2) shared her perception that Google is the top choice for undergraduate students' for all types of information seeking,

> So I would say hands down Google and the sources found through Google. … I think Google is the first place and I think the reason is that it's easy to use. I mean I think for all of the pitfalls that we think of that Google is having in terms of academic research, you know their greatest strength is that they have mastered that search interface, you know, both for undergraduates and for anybody in general in their everyday lives. It's just a matter of it is very easy to use and they really have it figured out, you know, that algorithm, that formula, to make it functional.

In further support of this finding, librarian L8 (University 2) explained,

> No question. We ask a question similar [in our information literacy classes in the library] to that and, you know, it's a clicker question, "When I need information I start with..." And Google is an answer and Wikipedia is an answer and the library is an answer and I think my friends is answer. I think we have five different things in there. And Google … we know this is going to happen … Google is the number one answer in all classes. Sometimes it is 100% of the students.

While the majority of student interview participants (n=16, 88.9%) acknowledged that Google was their most preferred resource for everyday life information seeking, noticeably fewer student interviewees (n=7, 38.9%) indicated that they would first turn to Google for their course-related research. Among those who turn first to Google, regardless of the type of information being sought, senior PS8 (University 2) explained,

> I think kids our age or like the generation know how to search for stuff on their own, just having been growing up with it. It doesn't mean that library databases are obsolete or anything, but I just think it is easier and more innate to people our age to just find answers on their own and know where to look.

Other students acknowledged that while they may initially start with Google when beginning their academic research, they will turn to the academic library's online resources once they have a sense of their topic. Sophomore student, PS12 (University 2), explained,

> Usually I would probably start on Google to get a basic idea of something I may be interested in for like a more basic layout. And, if I want to pursue that as my actual topic, then later I would get legitimate sources and information from actual articles that are considered scholarly.

Junior student, PS9 (University 1), also noted, *"... I use Google a lot for just looking up a general idea of somewhere I can get the information. Or, there are certain online databases that are really useful for other stuff, other parts of the information that I really need*.

However, comments from many student interview participants suggest their choices of resources for course-related research are situationally dependent. While there are times that undergraduate students may feel it is appropriate to start first with Google, there are others times where it may make more sense for them to turn first to the assigned course reading materials or online library materials. Junior student, PS2 (University 2), shared her perspective,

> I would definitely start out with the class resources, just notes and stuff like that. That would be the first basics of it and then from there I'd probably go to Google but if that is not really that reliable or depending on how big this research paper is … then I would probably start going to the library and using the library resources basically to find better articles and actual scholarly articles.

Thus, while findings from the quantitative survey data suggest undergraduate students most frequently consult Google or other search engines when approaching a course related research assignment, both quantitative and qualitative interview findings suggest other more academically related resources such as professors, course assigned reading materials, and academic library online resources play an important role for students in their information seeking.

Technology tool preferences vary depending upon type of research.

To explore the truth of **Proposition 8**, "There are commonalities among undergraduate students with respect to the types of technology they prefer to use for information seeking," undergraduate student survey participants were first asked to indicate what types of technology devices they owned and then to rate the frequency with which they used these technology devices to answer both everyday life and course-related research questions during a typical week of the school year. Librarian and undergraduate student interview participants also responded to questions related to student technology tool preferences for both types of information seeking. Findings from analysis of both quantitative and qualitative data overwhelmingly suggest that students most frequently turn to their smartphones to answer questions that arise during their everyday lives, while they most frequently utilize their laptops for course-related information seeking.

Survey participants were first asked to indicate which types of technology devices they owned that could be utilized for information seeking via a checkbox response item. Ownership of both laptops (n=821) and smartphones was nearly identical (n=814) among survey participants, with ownership of tablets (n=361), desktop computers (n=142), cell

phone that is not a smartphone (n=43), and other (n=30) noticeably lower. These findings are outlined in Table 12.

Table 12

Technology Devices Owned by Undergraduate Students

Device	Count (N)
Laptop Computer	831
Smartphone	814
Tablet	361
Desktop Computer	143
Cell phone (not a smartphone)	43
Other	30

Survey participants were also asked to rate the frequency with which they use these same technology devices to access the internet to answer questions that arise during the course of their everyday lives as well as for their course-related assignments and research papers (7-point scale, 1=never/7=almost always). For everyday life questions, survey findings suggest students turn most frequently to their smartphones (M=6.63, SD=0.99), followed closely by their laptops (M=6.45, SD=1.18). Means for usage of all other devices for everyday life research were below average (Other, M=3.40, SD=2.39; Tablet, M=3.36, SD=2.34; Work Desktop, M=3.36, SD=2.28; Library Desktop, M=2.89, SD=1.90; Personal Desktop, M=2.39, SD=1.97). However, if students are seeking information to complete their course-related assignments and research papers, survey findings suggest they most frequently turn to their laptop computers (M=6.60, SD=1.07), with smartphone usage falling next in line (M=4.41, SD=2.10), followed by desktop computers in the library (M=3.34, SD=2.14), tablets (M=2.89, SD=2.19), desktop

computers in residence (M=2.48, SD=2.10), desktop computers at work (M=2.33, SD=1.99, and other (M=2.82, SD=2.24). These findings are further outlined in Table 13.

Table 13

Technology Tool Preferences

	ELIS			Academic		
Information Resource	**N**	**Mean**	**Std Dev**	**N**	**Mean**	**Std Dev**
Smartphone	**825**	**6.63**	**0.992**	**822**	**4.41**	**2.096**
Laptop Computer	**835**	**6.46**	**1.184**	**837**	**6.60**	**1.065**
Tablet	634	3.36	2.340	645	2.89	2.188
Desktop Computer at Work	602	2.94	2.287	609	2.33	1.994
Desktop Computer in Residence	613	2.39	1.970	630	2.48	2.103
Desktop Computer in Library	766	2.89	1.898	770	3.34	2.140
Other Technology Device	78	3.40	2.392	82	2.82	2.240

Findings from thematic analysis of librarian interview data lend further support to these findings which suggest choice of technology device varies depending upon the type of information that is being sought. Librarian L4 (University 3) observed that for everyday life questions, students seem to be using their smartphones, "*That's what I see a lot. You know, if they have a question they'll come up [to the reference desk] and show me their phone and they'll ask me."* Librarian L7 (University 2) explained that for course-related research, she has noted that students are more likely to use their laptops, explaining, "*When I walk around [the library] that's what I see and I think I see, just in terms of articles, when they're pulling up articles to read or just product their writing, I*

think they just need to be on something that's a little bit larger." L1 (University 3) also suspects that students are more inclined to use their laptops for conducting research because the "*... mobile interface for Google is great, but the mobile interfaces for a lot of library stuff leaves something to be desired."*

Similarly, findings from the thematic analysis of undergraduate student interview data lend credence to Phase II survey findings which suggest that while students most frequently use their smartphones (n=9, 50.0%) for everyday life information seeking, laptops are another popular choice. Student PS2 (University 2) explained that for daily life questions, she will "*... probably use my phone the most, but if I had my laptop or my tablet, if I have that up then I'll just use that. But I definitely use my phone more.*" Likewise, PS14 (University 3) explained, "*The phone would be just like for a quick question that I needed to answer and say if I had a more in-depth question then I would use my laptop."*

The overwhelming majority of undergraduate student interview participants (88.9%, n=16) indicated that laptops are the most preferred technology tool for course-related information seeking. Student S1 (University 3) explained that he prefers to use his laptop for course-related research because, "*Sometimes the information on my smartphone ... I feel like it doesn't give you as much information as the laptop does. They kind of make it into a mobile version instead of a full version of something.*" Other students like PS11 (University 3) noted, "*It's just a whole lot easier and quicker to look up a whole lot of information and to keep it organized [on a laptop] than on my phone.*"

Group differences are present with respect information resource preferences.

To assess the truth of **Proposition 9** "Group differences exist among undergraduate students with respect to their preferences for information seeking" one-way ANOVA and LSD post hoc analyses were conducted across demographic variables for the five most highly rated information resource preferences for both everyday life and course-related information seeking. One-way ANOVA and LSD post hoc analyses were also conducted across demographic variables for the two mostly frequently utilized technology tools for everyday life and course-related information seeking – smartphones and laptop computers. Significant findings are outlined in Tables 14 and 15. Group differences were assessed for all demographic variables noted in this study, with the exception of age, enrollment status, and international student status which were not evaluated due to small sample sizes in some of the subgroups. Statistically significant findings suggest that group differences do, indeed, exist among undergraduate students with respect to their preferences for both information resources and technology devices as they relate to their everyday life and academic information seeking.

ELIS resource preferences vary across demographic variables.

Findings from one-way ANOVAs of the quantitative survey data suggest that significant differences exist among many demographic groups with respect to undergraduate students' preferences for everyday life information resources. These groups include those related to university affiliation, gender, academic major, and parents' highest level of education. More specifically, undergraduate students' use of

Google for everyday life information seeking differed significantly, though with extremely low effect sizes, according to gender ($F_{(1,830)} = 13.854$, $p < .001$, $\eta_p^2 = 016$) and university affiliation ($F_{(2,953)} = 5.605$, $p = .004$, $\eta_p^2 = .012$). With respect to gender, females consulted Google for their everyday life research significantly more often than males. LSD post hoc analyses also revealed that students at University 2 were significantly more likely to use Google for their everyday life research than their peers at University 1. One-way ANOVA analysis also revealed that differences exist between gender groups with respect to frequency of consultation with family and friends for everyday life research ($F_{(1,830)} = 25.034$, $p < .001$, $\eta_p^2 = .029$), with females consulting family and friends significantly more often than males.

One-way ANOVA analysis further revealed significant group differences with respect to use of Wikipedia based upon gender ($F_{(1,831)} = 14.653$, $p < .001$, $\eta_p^2 = .017$), university affiliation ($F_{(2,952)} = 10.235$, $p < .001$, $\eta_p^2 = .021$), academic major ($F_{(4,732)} = 9.820$, $p < .001$, $\eta_p^2 = .051$), and parent's highest level of education ($F_{(5,779)} = 3.086$, $p = .009$, $\eta_p^2 = .019$). All significant ANOVA findings relating to Wikipedia had small effect sizes, with the exception of academic major, which had a moderate effect size. Findings suggest males consulted Wikipedia significantly more often than females. LSD post hoc analysis further revealed that students enrolled at University 2 consulted Wikipedia significantly more often than students at University 3. With respect to academic major, a LSD post hoc analysis revealed that STEM majors were significantly more likely to consult Wikipedia for everyday life research than those majoring in Arts/Humanities, Social Sciences, Business, or Health related fields. Findings further suggest that

Arts/Humanities majors consulted Wikipedia significantly more often than students majoring in Business or Health related fields. Finally, Social Science majors were noted to consult Wikipedia significantly more often than students majoring in Health related fields. Additional LSD post hoc analyses also revealed that students whose parents have a 4-year degree or higher consulted Wikipedia significantly more often than those whose parents who do not hold such degrees. More specifically, students whose parents earned a bachelor's, master's, or doctoral level degree consulted Wikipedia to a significantly greater degree than students whose parent's earned a high school diploma *or* attended some college but did not earn a degree. LSD findings further suggest that students whose parents earned a master's degree consulted Wikipedia significantly more often than those whose parents earned an associate's degree.

Course-related resource preferences vary across demographic variables.

Findings from one-way ANOVA analyses of the quantitative survey data suggest that significant differences also exist among a host of undergraduate student demographic groups with respect to information resource preferences for course-related assignments and research papers. Significant group differences were noted based upon university affiliation, GPA, gender, race, academic major, family income, and attendance at a library instruction class. The details of these findings are outlined in Table 14.

Table 14

Information Resource Preferences – Significant ANOVAs*

	Everyday Life Info Seeking				Academic Info Seeking			
Information Resource	*F*	Sig. (*p*)	Effect (η_p^2)	Pow. (1-β)	*F*	Sig. (*p*)	Effect (η_p^2)	Pow. (1-β)
Google								
Univ.	5.605	.004	0.12	.858	--	--	--	--
Gender	13.854	<.001	.016	.961	--	--	--	--
Fam./Friends								
Gender	25.034	<.001	.029	.999	--	--	--	--
GPA	--	--	--	--	4.918	.002	.018	.911
Univ. Website								
Gender	--	--	--	--	12.611	<.001	.015	.944
Wikipedia								
Univ.	10.235	<.001	.021	.987	10.096	<.001	.022	.986
Gender	14.653	<.001	.017	.969	21.438	<.001	.025	.996
Parent Ed	3.086	.009	.019	.875	--	--	--	--
Race	--	--	--	--	8.025	<.001	.022	.956
Major	9.820	<.001	.051	1.00	8.466	<.001	.044	.999
Smtph Brow								
Univ.	--	--	--	--	6.401	.002	.014	.902
Race	--	--	--	--	6.021	.003	.016	.883
GPA	--	--	--	--	4.506	.004	.016	.883
Course Rdgs	N/A	N/A	N/A	N/A				
Gender	--	--	--	--	16.162	<.001	.019	0.98
Professors	N/A	N/A	N/A	N/A			.	
Univ.	--	--	--	--	8.888	<.001	019	.972
Gender	--	--	--	--	16.880	<.001	.020	.984
Major	--	--	--	--	5.056	.001	.027	.965
Fam. Inc.	--	--	--	--	2.834	.015	.021	.840
Lib Class	--	--	--	--	8.675	<.001	.019	.969
Lib Database								
Gender	--	--	--	--	12.889	<.001	.015	.948
Major	--	--	--	--	9.285	<.001	**.048**	1.00
Fam. Inc.	--	--	--	--	3.671	.003	.027	.930
Lib Class	--	--	--	--	38.230	<.001	**.079**	1.00

* Only demographic variables with statistically significant ANOVAs are listed.

One-way ANOVAs revealed significant mean differences among GPA groups with respect to frequency of consulting family and friends for course-related research. More specifically, students who reported GPAs in the lowest range (2.5 or below)

reported that they consulted family and friends for their academic research significantly more often than students in all other GPA groups (3.6-4.0, 3.1-3.5, and 2.6-3.0). Students with GPAs of 2.6-3.0 also reported that they consulted their family and friends with significantly greater frequency than those with higher GPAs (3.6-4.0 or 3.1-3.5). Finally, students who reported their GPAs as 3.1-3.5 reported that they consulted their family and friends for course-related research significantly more often than those earning a GPA of 3.6-4.0. Significant group differences were also noted between genders with respect to their frequency of consulting university websites ($F_{(1,829)} = 12.611$, $p < .001$, $\eta_p^2 = .015$) and course readings ($F_{(1,831)} = 16.162$, $p < .001$, $\eta_p^2 = .019$), though with a small effect noted for each factor. For these measures, females consulted university websites and course readings significantly more often than males for course-related research.

Similar to findings for everyday life information seeking, one-way ANOVA analysis revealed numerous significant group differences with respect to the frequency of using Wikipedia for course-related research. Significant group differences were noted based upon gender ($F_{(1,820)} = 21.438$, $p < .001$, $\eta_p^2 = .025$), university affiliation ($F_{(2,900)} = 10.096$, $p < .001$, $\eta_p^2 = .022$), academic major ($F_{(4,728)} = 8.466$, $p < .001$, $\eta_p^2 = .044$), and race ($F_{(2,718)} = 8.025$, $p < .001$, $\eta_p^2 = .022$). All significant ANOVAs relating to the use of Wikipedia for course-related research had small effect sizes, with the exception of academic major, which had a small to moderate effect size. Findings from this analysis revealed that males consulted Wikipedia for course-related research significantly more often than females. LSD post hoc comparisons further revealed that students from University 2 consulted Wikipedia significantly more often than students at University 1

and University 3. With regard to academic major, students majoring in STEM fields consulted Wikipedia for course-related research significantly more often than those majoring in Arts/Humanities, Social Sciences, Business, or Health related fields. Students majoring in Arts/Humanities also consulted Wikipedia significantly more often than those majoring in Business or Health related fields. Finally, students majoring in Social Sciences consulted Wikipedia significantly more often than those majoring in Health related fields. With respect to race, LSD comparisons revealed that Asian/Native Hawaiian/Pacific Islander students consulted Wikipedia for course-related research significantly more often than White/Caucasian or Black/African American students.

One-way ANOVA analysis also revealed statistically significant group differences with respect to undergraduate students' use of a smartphone browser for course-related research. These groups include those related to university affiliation ($F_{(2,900)} = 6.401$, $p = .002$, $\eta_p^2 = .014$), race ($F_{(2,718)} = 6.021$, $p = .003$, $\eta_p^2 = .016$), and GPA ($F_{(3,824)} = 4.506$, $p = .004$, $\eta_p^2 = .016$), all with low effect sizes. More specifically, Fisher's LSD post hoc analysis revealed that students at University 3 consulted their smartphone browsers for course research with significantly greater frequency than students at University 1 and University 2. Post hoc analysis also revealed that Black/African American students consulted their smartphone browsers for course-related research significantly more often than White (Caucasian) or Asian/Native Hawaiian/Pacific Islander students. Across GPA groups, students who reported their GPAs to be between 3.6-4.0 consulted their smartphone browsers for course related research significantly less often than students in all other GPA groups (2.5 or below, 2.6-3.0, 3.1-3.5).

Survey findings suggest professors are another popular choice for course-related information seeking. One-way ANOVA analysis revealed numerous significant group differences for this factor, including gender ($F_{(1,830)} = 16.880$, $p < .001$, $\eta_p^2 = .020$), university affiliation ($F_{(2,900)} = 8.888$, $p < .001$, $\eta_p^2 = .019$), academic major ($F_{(4,728)} = 5.056$, $p < .001$, $\eta_p^2 = .027$), family income ($F_{(5,673)} = 2.834$, $p = .015$, $\eta_p^2 = .021$), and attendance at a library instruction class ($F_{(2,884)} = 8.675$, $p < .001$, $\eta_p^2 = .019$), all with small effect sizes. With regards to gender, findings suggest females consulted their professors significantly more often than males. LSD post hoc comparisons further revealed that students at both University 1 and University 3 consulted their professors for course-related research significantly more often than students at University 2. With regard to academic major, post hoc analysis revealed that students majoring in Arts/Humanities consulted their professors for course-related research significantly more often than those majoring in STEM, Business, Social Sciences, and Health related fields. Findings also suggest students majoring in Business and Health related fields consulted their professors for course-related research significantly more often than STEM majors. Post hoc analysis also revealed that frequency of consultation with professors for course-related research differed among family income groups. Findings from this analysis suggest those in the lower income groups (less than $20,000/year, $20,000 - $34,999/year, and $35,000 - $49,000/year) consulted their professors significantly more often than students in the highest income group ($100,000/year or above). Findings from LSD post hoc analysis also suggest that students who attended two or more library

instruction classes were significantly more likely to consult with their professors for course-related research than those who attended only one library class or no classes at all.

Lastly one-way ANOVAs revealed significant group differences with respect to students' consultation of library databases for course-related research. Significant group differences were noted based upon gender ($F_{(1,834)} = 12.889$, $p < .001$, $\eta_p^2 = .015$), academic major ($F_{(4,731)} = 9.285$, $p < .001$, $\eta_p^2 = .048$), family income ($F_{(5,674)} = 3.671$, $p = .003$, $\eta_p^2 = .027$), and attendance at a library instruction class ($F_{(2,889)} = 38.230$, $p < .001$, $\eta_p^2 = .079$). Reported effect sizes for gender and family income were low, while the effect size for academic major was low to moderate, and that for library instruction class attendance was moderate. Findings suggest that females consulted library databases significantly more often than males. LSD post hoc analysis further revealed that students majoring in Arts/Humanities, Social Sciences, Business, or Health related fields consulted library databases with significantly greater frequency than students pursuing STEM majors. Students majoring in the Social Sciences were also noted to consult library databases significantly more often than students majoring in Business fields. Differences were also noted among family income groups, with LSD post hoc analysis revealing that those in the highest income group ($100,000 or above) consulted library databases significantly less often than those in nearly all other income groups (less than $20,000/year, $20,000 - $34,999/year, $35,000 - $49,999/year, and $75,000 - $99,000/year). Finally, significant group differences were noted, with a moderate effect size, between groups related to attendance at a library instruction class. More specifically, LSD post hoc comparisons revealed that students who attended two or more library

instruction classes consulted library databases significantly more often than those who attended one library class or none at all. Further, students who attended one library class consulted their library's online databases with significantly greater frequency than those who had not attended a library class at their universities.

Technology tool preferences vary across demographic groups.

To further assess the truth of **Proposition 9**, one-way ANOVA analyses and LSD post hoc comparisons were conducted to assess whether group differences were present with respect to the two most frequently utilized tools for both everyday life and course-related research -– smartphones and laptop computers. Statistically significant findings suggest that group differences do, indeed, exist among undergraduate students with respect to their preferences for particular technology devices for everyday life and academic information seeking. These findings are further outlined in Table 15.

Table 15

Technology Tool Information Seeking Preferences - Significant ANOVAs*

	Everyday Life Info Seeking				Academic Info Seeking			
Technology Device	*F*	Sig. (*p*)	Effect (η_p^2)	Pow. (1-β)	*F*	Sig. (*p*)	Effect (η_p^2)	Pow. (1-β)
Smartphone								
University	--	--	--	--	9.034	<.001	.022	.974
Race	--	--	--	--	9.783	<.001	.027	.983
Intern'l Stud.	--	--	--	--	9.011	.003	.011	.850
Laptop								
University	8.927	<.001	.021	.973	5.274	.005	.012	.835
Major	--	--	--	--	3.265	.011	.018	.836
Fam. Income	2.749	.018	.020	.827	--	--	--	--
Parent's Ed.	2.754	.018	.018	.828	--	--	--	--

* Only demographic variables with statistically significant ANOVAs are listed.

ELIS technology tool preferences for laptops vary across demographic variables.

One-way ANOVAs did not reveal any significant group differences with respect to the use of smartphones for everyday life information seeking across all demographic variables. Preferences for laptops for everyday life information seeking, however, revealed significant group differences among numerous demographic variables including university affiliation ($F_{(2,832)} = 8.927$, $p < .001$, $\eta_p^2 = .021$), family income ($F_{(5,663)} = 2.749$, $p = .018$, $\eta_p^2 = .020$), and parent's highest level of education ($F_{(5,771)} = 2.754$, $p = .018$, $\eta_p^2 = .018$), all with small effect sizes. More specifically, LSD post hoc comparisons revealed that students at University 2 utilized their laptop computers for everyday life research significantly more often than students at University 1 and University 3. Additionally, students who reported their family incomes as middle to upper middle class ($50,000 - $74,999/year, $75,000 - $99,999, and $100,000 or above) reported using their laptops for everyday life research with significantly greater frequency than those who reported their family incomes to be $20,000 - $34,999/year. Students who reported their family income as $100,000 or above were also noted to utilize their laptops significantly more often for everyday life research than those with incomes of $35,000 - $49,999/year. Finally, students whose parents held a master's degree utilized their laptops for everyday life research significantly more often than students whose parents' highest level of education was high school graduate or equivalent, some college with no degree, or a bachelor's degree. Similarly, students whose parents' highest level of education was at the doctoral level utilized their laptops

for everyday life research significantly more often than those whose parents attended some college but did not earn a degree.

Course-related technology tool preferences vary across demographic variables.

One-way ANOVAs and LSD post hoc comparisons were also conducted to assess whether significant group differences were present with respect undergraduate students' preferences for using smartphones and laptops for course-related research. Significant mean differences relating to the use of smartphones for academic research were noted based upon university affiliation ($F_{(2,819)} = 9.034$, $p < .001$, $\eta_p^2 = .022$) and race ($F_{(2,699)} = 9.783$, $p < .001$, $\eta_p^2 = .027$), though with small effect sizes. More specifically, LSD post hoc comparisons revealed that students enrolled at University 3 reported using their smartphones for course-related research with significantly greater frequency than students at University 1 or University 2. With respect to race, Black/African American and Asian/Native Hawaiian/Pacific Islander students reported using their smartphones for course-related research significantly more often than White (Caucasian) students.

With respect to students' use of laptops for course-related research, one-way ANOVAs revealed significant mean differences among groups based upon university affiliation ($F_{(2,834)} = 5.274$, $p = .005$, $\eta_p^2 = .012$) and academic major ($F_{(4,723)} = 3.265$, $p = .011$, $\eta_p^2 = .018$), though with negligible effect sizes. More specifically, LSD post hoc comparisons revealed that students enrolled at University 2 reported using their laptops for course-related research significantly more often than students at University 3. LSD post hoc comparisons further revealed that students majoring in the Social Sciences used their laptops for course-related research with significantly greater frequency than those

majoring in Arts/Humanities and Health related fields. Likewise, Business majors utilized their laptops for course research significantly more often than those majoring in Health related fields.

Addressing Everyday Life and Academic Information Needs is Viable for Libraries

To answer **Research Question 4**, "To what extent is addressing the everyday life information needs of students a viable option for academic libraries?" and to explore the truth of **Proposition 10**, "There is a clear overlap between the everyday life information needs of undergraduate students and the ability of academic libraries to meet these needs," data were collected and analyzed for all six data sources for this study including quantitative survey data, qualitative data from interviews with librarians, enrollment and retention officials, undergraduate students (pre- and post-survey), and quantitative data collected from the Phase IV library website feature analysis. Data were then mixed for in-depth comparison across data sources. Overall, findings suggest academic libraries are largely equipped to meet the everyday life information needs of students and, with a minor restructuring and realignment of priorities, could feasibly serve as a campus information hub for the university The findings from the analysis of data from these six data sources as they relate to Research Question 4 and Proposition 10 are discussed in greater depth below.

First, to assess the viability of academic libraries' abilities to address the everyday life information needs of students, an assessment was conducted to determine the degree of difference between the potential library services, tools, or features that students indicated they were likely to use if available and the presence of these items on academic

library websites. Findings suggest that there is truth to Proposition 10 for some aspects of students' everyday life and academic information needs and the ability of libraries to meet these needs. There are noteworthy gaps, however, between many of the potential services, tools, or features that undergraduate students feel they need and the presence of this information on academic library websites.

To assess where gaps exist, survey participants were asked to indicate their likelihood of using potential library tools, services, and features on a 7-point scale (1=very unlikely/7=very likely). Mean scores and percent frequencies of items receiving a rating of 5, 6, or 7 are outlined in Table 16. Findings suggest the six potential library services, tools, or features with the highest mean ratings also received above average ratings (5, 6, or 7 on a 7-point scale) by more than 75.0% of the survey participants. These items include "easy access to full-text articles (Full Text Access)" (M=5.95, SD=1.31, % frequency 5 or above = 86.80%), "pre-selected materials for courses or subject areas (Pre-Selected Materials)" (M=5.58, SD=1.45, % frequency 5 or above = 78.84%), "one search box for everything I need (One Search Box)" (M=5.48, SD=1.57, % frequency 5 or above=76.00%), "capability to just type in what I'm looking for without worrying about special searching language or strategies (Natural Language Searching)" (M=5.48, SD=1.53, % frequency 5 or above = 75.86%), "career/job information (Career Information)" (M=5.47, SD=1.46, % frequency 5 or above=78.25%), and "capability to search the library and Google (or other search engines) at the same time (Search Google & Lib Same Time)" (M=5.45, SD=1.60, % frequency 5 or above=75.88%).

This list of library services, tools, and features was used to assess the percentage of library websites identified for Phase IV that possessed these items as operationally defined on the assessment tool (see Appendix S). For example, the item "capability to search the library and Google at the same time" was operationally defined as, "Is there a link to Google Scholar directly on the library's homepage?" If a link to Google Scholar was present, then that library would be noted as possessing that item. However, if the only link to Google Scholar was found among the library's list of databases and not on the homepage, then the library would not be marked as having this item.

Table 16

Potential Library Services, Tools, and Features – Undergraduate Students' Likelihood of Use and Libraries Abilities to Meet Needs

Service, Tool, or Feature	n	Mean	SD	Stud. Rating 5, 6, 7 (%)	Library w/ Item (%)	% Dif. (Stud-Lib)
Full Text Access	1017	5.95	1.307	86.80	74.00	12.80
Pre-Selected Materials	1016	5.58	1.454	78.84	96.00	-17.16
One Search Box	1021	5.48	1.568	76.00	76.00	0.00
Natural Language Searching	1023	5.48	1.526	75.86	74.00	1.86
Career Information	984	5.47	1.461	78.25	58.00	20.25
Search Google & Lib Simult.	1020	5.45	1.599	75.88	8.00	**67.88**
Acad. Skill Building Prep	988	4.98	1.662	65.18	6.00	**59.18**
Customizable Website	1018	4.96	1.761	63.06	2.00	**61.06**
Mobile Library Website	1021	4.90	1.837	61.41	82.00	-20.59
News/Current Events	987	4.90	1.678	63.73	4.00	**59.73**
Campus Resource Info.	990	4.72	1.701	57.68	2.00	**55.68**
Financial Information	985	4.67	1.816	57.56	24.00	33.56
Mobile APP for Library	1021	4.67	1.934	54.95	4.00	**50.95**
Health Information	987	4.45	1.788	52.79	22.00	30.79
Tools Conn. w/other – campus	989	4.36	1.763	50.40	0.00	**50.40**
Online Chat Feature	1021	4.31	1.977	48.97	88.00	-39.03
Personal or Sub. Librarian	1017	4.17	1.848	45.03	94.00	-48.97
Tools Connect w/home	986	3.88	1.910	39.35	0.00	39.35

The percent differences between potential library tools, services, and features that students were likely to use and the percentage of library websites that possessed these items were compared and were found to vary greatly. These findings are illustrated in Table 16 and Figure 7. While some items had minimal differences between what students wanted and what library websites actually had such as One Search Box (difference = 0.0%) and Natural Language Searching (difference = 1.86%), other library items differed by more than 50%. Items with greater than 50% difference between what students want or need and the presence of these items on library websites include the ability to Search Google & Library at the Same Time (difference = 67.88%), Customizable Website (for easy access to favorite information sources) (difference = 61.06%), News/Current Events Information (difference = 59.73%), Academic Skill Building information (difference = 59.18%), information about Campus Resources (difference = 55.68%), Mobile App for the Library (difference=50.95%), and Tools to Connect with Others on Campus (difference = 50.40%). While these differences are noteworthy, the gaps for many of these items could potentially be minimized through a minor restructuring of information placement on library websites. For example, providing a direct link to Google Scholar from a library homepage with simple instructions on how to tie search results to library resources would immediately allow students to Search Google & Library at the Same Time, often with full-text online access to the materials identified in the search results.

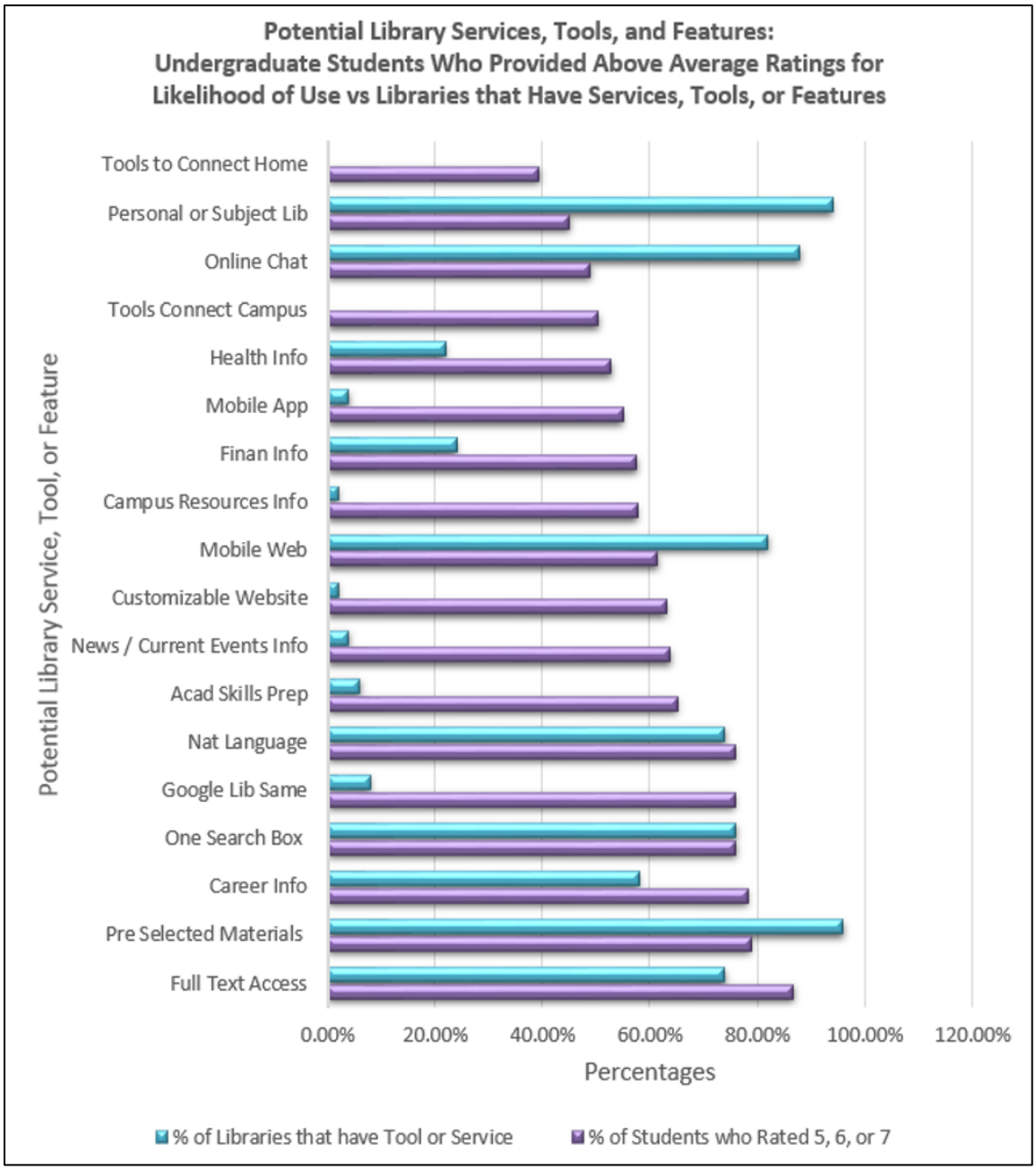

Figure 7. Potential Library Services, Tools, and Features

It is feasible for the campus library to serve as an information hub for the university.

To more thoroughly answer **Research Question 4**, the viability of creating a new model for the library was explored in this study. In this newly proposed model, the university library would expand its role and serve as a campus information hub, one that is equipped to address both everyday life and academic information needs of the campus community. In support of this concept, quantitative findings suggest students have an above average to high likelihood of utilizing potential library tools or services in support of everyday life information needs including those relating to careers (M=5.47, SD=1.461), academic skills preparation (M=4.98, SD=1.662), campus resources (M=4.72, SD=1.701), and finances (M=4.67, SD=1.816). In addition, thematic analyses of qualitative interview data collected from librarians, enrollment and retention officers, and undergraduate students (pre- and post-survey) overwhelmingly suggest that there is a viable place in the campus community for the library to serve in an expanded role as a campus information hub. Making this change a success, however, may require significant marketing, rebranding of the library, and additional resources.

To address the viability of such a model, university enrollment and retention officials were asked to share their thoughts. Officials at all three participating universities were overwhelmingly in favor of considering a new library model to better meet the information needs of the campus community. Officer R3 (University 3) shared his enthusiastic support for a new model,

> And it seems to me that rebranding to go to a knowledge hub absolutely makes sense. … I wonder what a re-branding like that would look like that would say,

> "You know, go to the library to get information on health professions, or information on tutoring, information on financial aid." I think it could be a very neat model.

In further support of a new model, officer R1 (University 2) shared her perspectives,

> I think one of the things our campus lacks is a central space for learning support. … [W]hat if the undergraduate library was a central hub … the Learning Commons concept... This is where you go for your tutoring … How do I manage time? How do I go through a syllabus and make a weekly schedule and ... just... How do I take notes successfully? I mean, it's just ... It's really just academic skills. … It's not subject specific but more generalized … just even having a space there where students could go, then it would also bring students to the library as well. … [I]t seems like it would make sense, you know, to have some central information portal for that kind of, you know, where do you get learning support ... Where do I actually go to look for this? … Yeah, so just basic, "how to be a student here and be successful" from research to general studies would be helpful.

Likewise, librarians were asked to brainstorm ideas that might help address both the everyday life and academic information needs of students and to share their insights as to whether they thought students would utilize the everyday life resources if they were available. Librarian responses were overwhelmingly in favor of the concept of the library serving as a campus information hub (n=8, 100%). Librarian L3 (University 3) shared his thoughts,

> Having it [the library] as a focal points so students know... I know the library won't do this for me, but they know who I can talk to help with this issue that I have. I think libraries can even more so fulfill the need of being that clearinghouse or a focal point for helping students get any type of service they need just because we are a location for providing friendly support, not just academic support, but also being the center of campus and being open many hours a week, unlike services that close at 5:00 PM or only open four days a week - so I do think the library has a role, an even greater role in that regard.

In further support of the campus information hub model, librarian L5 (University 1) explained,

> [O]n our campus at least... we have, maybe not all of the students by any means, but we have a body of students who find the library as that neutral space and come here for more than just information. So, I do think if this were set up and then advertised, marketed properly, then it could make it a very viable part of the campus community and extend what already is a viable part of the campus community, but extend that in a supportive way for retention and issues of that kind.

Findings from thematic analysis of student interview comments (n=14, 73.7%) further suggest that undergraduate students would be inclined to use the library to meet many of their everyday life information needs if such information and services were available in a centralized hub. In response to the interview prompt, "*If the library had really accessible information to campus resources and other information like financial issues, career information, job seeking skills …*," student PS1 (University 2) noted,

> Those are all things that, if the library offered them, I would definitely use ... because I do go to, for example, the career center on campus to try to talk to advisors and people there about what my future, you know, my career, and stuff like that. But if the library would offer things like that... yeah... I would probably use it more.

Likewise, student PS9 (University 1) noted,

> A lot of people I know in college still do consider the library to be a good central hub for finding most of the information they want. So if all of that stuff [everyday life information resources] were offered through the library, I can see people, once they understand that that is the easiest place to find it, I can see people going to the library for it.

Finally, student PS4 (University 1) explained how a centralized campus information hub would benefit her, "*I think college is a crazy time for being a "big kid" and learning about all of that kind of stuff, so I think it's ... It would be nice to know who to ask or where you could go to find something.*"

A new library model would require a shift of priorities, rebranding, and marketing.

While both quantitative and qualitative data suggest a new model for the library is a viable consideration, further analysis of qualitative comments, particularly from librarians and retention officer suggests that a new model may not be successful without a shifting of priorities, rebranding, and significant marketing. Librarians L3 and L4 (University 3) noted that while they would be in support of a new library model, it would require a significant shift of priorities and resources. L3 explained,

> You do have to manage the ability of libraries to serve ever increasing roles based upon declining budgets and often smaller workforce … so needing to sort of manage the responsibilities and expectations of what we can do.

L4 further noted, "*At least at the moment... [the library is] focused on traditional and current services. ... I think we could do more, but we would need more resources or we would need to ... have a significant shift in what we are doing*."

Additionally, a successful new library model may require rebranding and significant marketing. Retention official R3 (University 3) shared his perspective,

> I think university libraries could use sort of a rebranding. … I keep thinking to myself... "When I'm going to the library" what are you thinking? Books. … And it seems to me that rebranding to go to a knowledge hub absolutely makes sense. ... Books is still the bottom line when I think of library. ... I think this is a fascinating

> kind of thing. I wonder what a re-branding like that would look like that would say, "You know, go to the library to get information on health professions, or information on tutoring, information on financial aid." I think it could be a very neat model. … Or it could be something as extreme as not using the word "library."

Librarian L5 (University 1) indicated that she feels a campus information hub model would be an asset to the university community, but would require significant marketing. She explained,

> So, I do think if this [campus information hub] were set up and then advertised, marketed properly, then it could make it a very viable part of the campus community and extend what already is a viable part of the campus community, but extend that in a supportive way for retention and issues of that kind (L5).

Likewise, librarian L6 (University 1) noted that marketing a new model for the library would be essential. She explained,

> I feel like we could play such a greater role. … I think, again, we would have to build an expectation because I don't think that many of them [students] would have that experience of a library in the past. ... I think in their minds the library still plays such a traditional role. I've had so many conversations with students where they've said, "Oh, I didn't know you would know that" or "I wish I would have asked you that a year ago."... We haven't help build the expectations that, in fact, there are many things that we understand about the student experience and that there are many ways that we can offer assistance (L6).

Chapter Summary

This chapter has reviewed the results of descriptive and inferential statistical analyses of quantitative data and thematic analysis of qualitative data to assess the study's four research questions and 10 corresponding propositions. First, variables relevant to the expectancy-value theory of motivation (expectancies for success,

subjective task value, and perceptions of cost) were assessed as they relate to undergraduate students' use of both the physical and online library. Findings suggest that students' perceptions of library value is a significant predictor of the frequency of their in-person library use, accounting for 1.1% of the variance in library use. Perceptions of both subjective task value and library cost were found to hold significant predictive value for determining frequency of use of online library resources, accounting for approximately 20% of the variance among online library use ratings. One-way ANOVAs were conducted to determine whether significant group differences were present with respect to students' frequency of library use. Further, Fisher's LSD and Games-Howell post hoc comparisons were used to assess where these group differences occurred. While there were numerous significant group differences identified, the most noteworthy was that relating to students' attendance at a library instruction class. Post hoc comparisons revealed that students who attended two or more library instruction classes utilized the library (both in-person and online resources) with significantly greater frequency than students who attended only one library session or none at all. Students who attended one library instruction class were also significantly more likely to access the library's online resources than those who had never attended a library class.

To develop a better understanding of the social cognitive information needs of undergraduate students, the most common everyday life and academic information needs *and* potential barriers to academic success were identified and compared across demographic groups using ANOVA and LSD or Games-Howell post hoc comparisons. Findings suggest undergraduate students need information about how to navigate campus

resources and services *and* information to help them complete their regularly assigned homework and more in-depth academic research papers. Potential barriers identified for this study include those related to academic readiness, finances, being supported by others, and social belonging. ANOVA analyses of these educational barriers revealed significant differences among many demographic groups including race (support by others), GPA (academic readiness and financial issues), family income (financial issues), and parent's highest level of education (financial issues). Finally, the four educational barriers factors and the three social cognitive career variables (performance goals, outcome expectations, and academic self-efficacy) were entered into stepwise multiple regression analyses to predict both the use of online library resources and students' GPA. Findings from the regression analyses revealed that academic readiness, social belonging, and performance goals were significant predictors of online library use, though accounted for only 2% of the variance of online library use ratings. Academic readiness, social belonging, financial issues, academic self-efficacy, and outcome expectations were significant predictors of GPA, accounting for approximately 22% of the variance of GPA scores.

Students' top information resources were identified and preferences assessed with regard to their everyday life information seeking and course-related research. Findings overwhelmingly suggest that Google is the top information resource for both everyday life and academic research. For some students, however, the choice of resources may be situationally dependent upon the requirements of an academic assignment. Commonalities were also assessed for technology preferences for information seeking.

Findings suggest that a smartphone is the most preferred tool for everyday life research, while the laptop is the most preferred tool for academic research. One-way ANOVAs were used to assess whether significant mean differences were present with regard to students' information resource and technology tool preferences. Numerous significant group differences were identified, including a noteworthy difference among academic majors related to preferences for using Wikipedia as both an everyday life and academic resource.

Finally, both qualitative and quantitative data collected across the four phases of this study were analyzed and compared to assess whether expanding the role of the library is a viability. Findings overwhelmingly suggest that librarians, university enrollment and retention officers, and undergraduate students are in favor of a new library model that is equipped to address both the everyday life and academic information needs of undergraduate students. Accomplishing this change, however, will require a shift of library priorities and resources, rebranding of the library, and significant marketing.

CHAPTER V

DISCUSSION

While equipped to play a pivotal role in student engagement and retention, findings in the research literature suggest academic libraries are underutilized by undergraduate students with respect to their use of available scholarly resources. This trend elicits cause for concern as positive correlational evidence presented in the research literature suggests library utilization is closely related to both students' academic performance (Barkey, 1965; Goodall & Pattern, 2011; Knapp, 1966; Robinson & Schlegl 2004; Wong & Webb, 2011) and university retention (Haddow, 2013; Mezick, 2007, 2015; Soria et al., 2013, 2014). Thus, this study was conducted with a two-fold purpose: (1) to better understand the factors relating to undergraduate student engagement/ disengagement with the academic library and (2) to explore whether university libraries should expand their role beyond providing academic resources and services into more "real-life" areas that are important to the daily lives of undergraduate students and in support of the university goal of retention. The goal of this chapter is to expand upon the constructs that were investigated in this study in order to more deeply understand undergraduate students' information needs and behaviors and the ability of libraries to meet these needs. As such, this chapter includes an overview of the study, an in-depth discussion of findings, study limitations, implications for future research, recommendations for practice, and concludes with a directive for future action.

Study Overview

To filter the complex ideas that were outlined for this study thoroughly and efficiently, a quantitative dominant four-phase sequential mixed methods design was used to collect data and analyze findings as they relate to the four research questions and 10 corresponding propositions proposed for this study. Using six separate instruments, both qualitative and quantitative data were collected over a three-month period during the Spring 2016 academic semester. Data collection included conducting semi-structured interviews with academic librarians (n=8), university enrollment and retention officials (n=3), and undergraduate students (pre-survey, n=2; post-survey, n=16), an online questionnaire completed by 1,280 randomly selected undergraduate students, and a quantitative analysis of 50 randomly selected university library websites. The study involved participants representing three large, primarily residential, 4-year or above public universities geographically distributed across the United States. The primary research questions for this study include:

- RQ1: What motivational variables best predict library utilization by undergraduate students?
- RQ2: What are the social cognitive information needs of successful students?
- RQ3: How do undergraduate students prefer to meet their information needs?
- RQ4: To what extent is addressing the everyday life information needs of students a viable option for academic libraries?

A discussion of the study findings as they relate to these research questions is outlined below.

Discussion of the Findings

Research Question One

What motivational variables best predict library utilization by undergraduate students?

In response to Research Question 1 and **Proposition 1**, "*Motivational variables are predictive of undergraduate students' utilization of academic library resources,"* quantitative findings suggest undergraduate students' perception of library value is a significant predictor of in-person library use, while perceptions of both library value and cost hold significant predictive value in determining students' frequency of use of their library's online resources. More specifically, qualitative findings suggest students value the physical library as a space to study and access technology equipment, while they utilize the library's online resources primarily for their attainment value, turning to these resources when required by their professors to earn favorable grades. Both quantitative and qualitative findings further suggest that when undergraduate students are not required to use the online library resources, they will opt for easier, more convenient online resources such as those found through Google to meet their academic information needs.

In response to **Proposition 2**, "*Group differences exist among undergraduate students with respect to their utilization of academic library resources*," findings suggest that statistically significant differences exist between groups with respect to frequency of use of online library resources, based upon the number of library instruction classes attended, race, first generation student status, family income, and academic major. Particularly noteworthy among these findings, Games-Howell post hoc analyses revealed that students who attended two or more library instruction sessions utilized the library's

online resources significantly more often than those who attended one class or none at all. Similarly, students who attended one library instruction class reported utilizing these resources with significantly greater frequency than those who had never attended a class.

Returning to the expectancy-value theory of motivation, Wigfield and Eccles (2002) propose that "…individuals' expectancies for success and the value they have for succeeding are important determinants of their motivation to perform different achievement tasks and their choices of which tasks to pursue" (p. 91). Though findings in the literature suggest that undergraduate students find online library resources difficult to use, thereby creating a mismatch between their expectancies for success and the value they place in using these resources (Connaway et al., 2006; De Rosa, 2005, 2006), these trends are not directly supported by the findings of this study. While this study's findings suggest that perceptions of library and cost hold predictive value for library use, the expectancies for success factor did not bring statistically significant value to the regression equation and was, therefore, excluded. The exclusion of this factor from the regression equation does not imply that it is unimportant. Rather, it may be that the students who participated in this study are homogenous with respect to this measure.

Research Question Two

What are the social cognitive information needs of undergraduate students?

In response to Research Question 2, findings from both quantitative and qualitative data analysis suggest the most common everyday life information needs of students relate to understanding how to navigate campus resources and services. This information need has not been previously identified in the body of literature that was

reviewed for this study. Findings from this study further suggest that the most common academic information needs of undergraduate students relate to finding appropriate information and tools necessary to complete course related research papers and regularly assigned homework. These findings align very closely with those reported by Head and Eisenberg (2011) and Given (2002) who also identified "finding and locating sources to complete course-related assignments" as the most frequently cited academic information need for undergraduate students.

In response to **Proposition 3**, " *There are common educational barriers among undergraduate students,"* study participants reported their greatest potential barriers to their academic success related to feeling underprepared to manage the academic rigor of college, including issues related to time management, and dealing with financial issues. Secondary barriers included those related to feeling supported by others and developing a sense of social belonging. These findings align very closely with those noted by Murtaugh (2012), Stoessel et al. (2015), and Thomas (2012) in which the researchers identified lack of preparation for higher education study, academic issues, feelings of isolation and /or not fitting in, and concerns about future aspirations as the primary reasons students report for dropping out of higher education study. Closely related to the above noted factors, findings from numerous other studies suggest that even persons with well-developed career paths will be unlikely to pursue that path if they perceive substantial barriers to achieving their goals (Brown & Lent, 1996; Luzzo & McWhirter, 2001; Raque-Bodgan et al., 2013) including, but not limited to parental support, financial worries, others' perceptions related to gender and ethnicity, academic readiness and study

skills, social "fitting in," and outside concerns such as employment and childcare. Thus, the potential barriers to educational success identified in this study may also be construed as social cognitive information needs, for when left unmet they can potentially lead to student drop-out.

In response to **Proposition 4**, "*Group differences exist among undergraduate students with respect to their common educational barriers,*" ANOVA findings suggest that statistically significant differences exist across numerous demographic groups as they relate to the potential barriers explored in this study. Particularly noteworthy, Games-Howell post hoc analysis revealed that White (Caucasian) students felt significantly more supported by others than Black/African American and Asian/Native Hawaiian/Pacific Islander students. Students with lower GPAs anticipated significantly more issues related to their academic readiness than students with higher GPAs. Finally, students who reported their family incomes in the lower ranges, those whose parents completed minimal to no higher education, and those with GPAs in the lower ranges reported anticipating financial issues to a significantly greater degree than their peers who reported family incomes in the upper ranges, whose parent's held a master's or doctoral level degree, and those with GPAs in the upper ranges. These significant group differences may serve as a reminder to those who work with students that there is no one-size-fits-all approach that will meet the needs of everyone. Instead, there must be room for flexibility in service delivery in order to meet the needs of diverse student populations.

Findings from a stepwise multiple regression analysis were used to address **Proposition 5**, "*Undergraduate students' contextual background and social cognitive factors are predictive of their utilization of academic library resources.*" The regression analysis revealed that academic barriers and social cognitive career factors related to academic readiness, social belonging, and performance goals held significant predictive value for determining the frequency of use of online library resources, though these factors accounted for only a small amount of variance among scores. Findings from a separate stepwise multiple regression analysis helped to address **Proposition 6**, "*Undergraduate students' contextual background and social cognitive factors are predictive of their overall academic success*." In this analysis, five factors including potential barriers related to academic readiness, social belonging, and financial issues *and* social cognitive career factors related to academic self-efficacy and outcome expectations were found to hold significant predictive value for determining GPA range, with these factors accounting for approximately 22% of the variance among scores.

Taken together, the findings relating to Research Question 2 and Propositions 3 through 6 suggest contextual and social cognitive factors, including perceived educational barriers, pose important considerations in understanding undergraduate students' information seeking needs, preferences, behaviors, and utilization of library resources. Further, while the findings from this study in no way imply that the predictive factors for library use and GPA will lead to student retention, they do lend support to a body of literature that has linked academic ability indices to persistence (Bean, 1980,

1985; Cabrera et al., 1992; Cabrera et al., 1993; Pascarella & Chapman, 1983; Tinto, 1975).

Research Question Three

How do undergraduate students prefer to meet their information needs?

In response to Research Question 3 and **Proposition 7**, "*There are commonalities among undergraduate students with respect to the types of information resources they prefer to use for their information seeking,* findings from both quantitative and qualitative data analysis suggest undergraduate students largely prefer to meet both their everyday life and academic information needs using Google or other search engines. These findings fall into close alignment with findings from previous studies which suggest that while librarians continue to work to promote information literacy among their student populations and improve accessibility to their online resources, many undergraduates continue to turn to other, more attractive alternatives such as Google to meet their information needs (Connaway et al., 2006; De Rosa, 2005, 2006). Because undergraduate students are likely to turn to search engines as their first step in both everyday life and course related information seeking, it is imperative that they develop the knowledge and strategies to effectively select and utilize both freely available online resources and academic library resources and be able to evaluate the sources they find.

In further response to Research Question 3 and **Proposition 7**, qualitative findings suggest that students' choices for academic information resources are often situationally dependent. There are many times when results from a Google search will suffice in meeting the needs of a particular assignment, while a more in-depth, scholarly oriented

research assignment may require a student to utilize the library's online resources. Other students noted that they first turn to Google to gain an overview of a topic for a research assignment, but then turn to the library's online resources for the level of scholarly materials required to complete the assignment. These findings lend further support to those published by Connaway et al. (2006) and Prabha et al. (2006) which suggest that undergraduate students make rational decisions that are contextually based as they carry out their information searches, choosing a strategy and level of effort based on situational needs and differentiating between quick and thorough searches (Connaway et al., 2006; He et al., 2012; Prabha et al., 2006). More specifically, the findings from the present study suggest that while undergraduate information seekers may rely heavily upon Google to meet their needs, their level of effort and search strategies are dependent upon the situation.

In response to **Proposition 8**, "*There are commonalities among undergraduate students with respect to the types of technology they prefer to use for information seeking,*" commonalities were noted among undergraduate students with respect to their technology preferences for information seeking. Findings from both quantitative and qualitative data analysis overwhelmingly suggest undergraduate students most typically prefer to use their smartphones to answer everyday life questions and their laptops for their course-related information seeking. Thus, while findings from both the Educause report of college students (Dahlstrom et al., 2015) and a Pew Internet Research survey of adults across the United States (Smith, 2011) suggest that younger adult smartphone owners are particularly likely to say that they mostly go online using their phones, the

findings from this study suggest that their choice of technology is situationally dependent.

Finally, in response to **Proposition 9**, "*Group differences exist among undergraduate students with respect to their preferences for information seeking,*" one-way ANOVA findings revealed statistically significant differences across numerous demographic groups relating to resource preferences for information seeking. Differences among academic majors are particularly noteworthy. Fisher's LSD post hoc analysis revealed that students pursuing STEM majors were significantly more likely to consult Wikipedia for both everyday life and academic information than students majoring in Arts/Humanities, Social Sciences, Business, and Health related fields. Additionally, students majoring in Arts/Humanities were significantly more likely to consult Wikipedia than those majoring in Business or Health related fields. Likewise, students majoring in Social Sciences were also significantly more likely to consult Wikipedia than individuals majoring in health related fields.

To further assess the truth of **Proposition 9**, ANOVA and LSD post hoc analyses were conducted with regard to undergraduate students' technology tool preferences for information seeking. Findings revealed statistically significant differences for this measure among numerous demographic groups for both everyday and course-related information seeking. Though group differences were identified relating to university affiliation, race, international student status, and academic major, all effect sizes were negligible, suggesting these differences may not be particularly noteworthy. Together, the findings relating to Research Question 3 suggest that it may be prudent for library

instruction sessions to be tailored to meet the varied preferences among different demographic groups, particularly academic majors. With respect to technology preferences, because there are pockets of students who prefer to conduct their academic information seeking via their smartphones, it is recommended that libraries make it a priority to ensure their websites are optimized for mobile searching and consider creating library smartphone apps to ensure these students have easy access to library tools, services, and information. Of particular relevance to academic libraries, findings from this study lend support to those noted by Pendell and Brown (2012) and Seeholzer and Salem (2011) which suggest information seekers are interested in searching library databases through mobile sites, despite the fact that some databases are not optimized for mobile access and may be difficult to access from a phone.

Research Question Four

To what extent is addressing the everyday life information needs of students a viable option for academic libraries?

Findings from the analysis of data collected across all four phases of this study overwhelmingly help to answer Research 4, suggesting that expanding the role of the library to address both the academic and everyday life information needs of students is a strong and viable option. Qualitative findings suggest librarians and university enrollment and retention officials can envision shifting the library's priorities and rebranding it as a campus information hub. Qualitative and quantitative findings from this study further suggest students want and need everyday life information and feel that they would utilize such resources if offered by the library.

One key aspect of addressing the viability of a new library model is to measure the alignment between the everyday life information and resources students want and need in order to be successful and the ability of libraries to meet these needs, thus addressing **Proposition 10**, "*There is a clear overlap between the everyday life information needs of undergraduate students and the ability of academic libraries to meet these needs*." While there is close alignment between many of the resources students want and the availability of these resources at academic libraries, there are also distinct gaps for others. Findings from a deeper exploration of the library websites reviewed during Phase IV of this study suggest many of these gaps may be addressed with a minor rearrangement of materials that may already be available through these sites. Closing the gap between other desired resources and libraries' abilities to meet these needs, however, may require a more significant shifting of library priorities and resources.

Academic Libraries Can Play a Pivotal Role in Undergraduate Student Retention

It is time for the university library to consider expanding its role beyond that of supporting students' academic success and begin to move into more every day, "real life" areas that are important to the daily lives of undergraduate students. Because the academic and everyday life information needs of students are so closely intertwined, attending to the formal (academic performance) and informal (faculty/staff interactions) academic systems and formal (extracurricular activities) and informal (peer-group) social systems as outlined in the *social integration theory* (Tinto, 1975; Tinto & Pusser, 2006; Rovai, 2003) from a library and information science perspective may be a useful and

viable solution for integrating students into their universities and helping them persist in their studies through graduation.

Further, while undergraduate students value the resources available to them through their academic libraries, it is critical that students find these resources to be convenient, easy to use, and relevant, as these factors appear to be primary drivers for students' choices of information resources. Because library instruction appears to play an important role in students' willingness to engage with online library resources, it is vital that these efforts continue to be emphasized and sustained, particularly focusing upon reaching students in their critical, first year of study. It is further recommended that library instruction efforts move beyond the single one-shot library instruction session and work towards having students participate in at least two sessions.

Limitations

Although every attempt was made to complete a thorough and comprehensive exploration of the factors relating to undergraduate students' engagement with their academic libraries and to explore the potentiality of a new model for libraries, the study was subject to numerous limitations. These limitations relate primarily to the site selection, sampling of participants, issues related to data collection and survey design, and researcher influence and experience. Each of these limitations presents opportunities for future research.

First, the sampling frame involved participants from only three large, public universities in the United States. Although many of the results align well with previous findings, they cannot be generalized beyond this study's population. It is also noteworthy

to mention that the university site selection was done out of convenience, as the institutions invited and selected to participate had a library dean or director who was known either to the researcher or a member of her doctoral committee. A randomized selection of universities may have helped to produce a more generalizable set of data. Further, while each of the universities selected was classified by Carnegie (2015) as a large, primarily residential, 4-year or above public university, it was later realized that undergraduate student admissions classifications for selectivity differed among the sites, with University 2 classified as "more selective" and University 1 and University 3 classified as "selective." Further, though the three universities were each designated as "large," the undergraduate student populations (University 1, n=8732; University 2, n=31,302; University 3, n=15.591) and sample sizes representing each of the universities (University 1, n=107; University 2, n=769; University 3, n=402) differed quite noticeably from each other. Because of these differences, there is a distinct possibility that data may have been skewed to reflect University 2 which had the greatest percentage of participants (60.17%). A more closely balanced sample of participants and homogenous university selectivity ratings may have elicited different and perhaps more trustworthy results.

A second limitation of this study relates to the sampling of undergraduate student participants. While sample selection was randomized, the nature of the data collection methods allowed for students to self-select whether to participate. Participants who completed the online survey may not accurately represent the larger pool of invited participants, thus compromising the generalizability of the findings. The relatively low

response rate (9.63%) and completion rate (71.20%) for the online survey component of this study is also a concern. There was a particularly low response rate for participants at University 1 (5.77%). Again, there is a risk that those who completed the survey may not accurately represent the larger pool of invited participants, further compromising the generalizability of the findings. Similarly, in Phase III of the study, a second layer of participant self-selection may have further compromised the findings. In this phase, a heterogeneous sample of participants was purposely selected from a volunteer pool of survey completers. Again, there is a risk that the perspectives of the Phase III participants may not accurately represent those of the larger undergraduate student population.

Some elements of the data collection process may also be considered as study limitations. Both interview and survey responses relied upon participants' self-reporting of data. With this brings a risk of "social desirability bias" in which participants may have a tendency to over report socially approved behavior (library usage) or desirable characteristics (e.g., high GPA, high parental level of education, high family income, and low perceived educational barriers) to present themselves in a favorable light (Groves et al., 2009). The timing of the survey invitations and response collection may also have impacted study results. Survey data were collected from mid-point in the semester to the last few weeks before semester end. These weeks tend to elicit more stress for undergraduate students as they approach final exams and projects. Therefore, the timing of the survey may have adversely affected the response rates for the study. The responses of those who did elect to participate in this study may have also been skewed, potentially reflecting an atypically high level of stress among students. Additionally, as students

work to complete final course research assignments and begin to prepare for final exams, there is a distinct possibility that the frequency of library use reported by survey participants may have been higher than if these data were collected earlier in the semester.

Four elements of survey design may also be perceived as limitations to the study. First, the social cognitive career factor, *performance goals*, was measured by a single item. To increase reliability, more items need to be added to the instrument for this factor, as there is significant risk that this single item will not produce consistent results. Second, data regarding undergraduate students' year in school (e.g., freshman, sophomore, junior, senior) was not collected. While this instrument was created based upon the literature and findings from earlier phases of the present study, this remained a significant and unfortunate oversight. Without this information, the ability to assess differences related to year in school and to assess changes over time was not possible. Data collection of students' GPAs in the form of a range (e.g., 2.5 or below, 2.6-3.0, 3-1.3.5, 3.6-4.0) proved to be another limiting factor in this study. If GPAs were collected as an interval measurement rather than forced into range categories, the predictive possibilities via regression analyses would be more meaningful. Finally, it was noted that the standard deviations for many of the psychosocial factors measured in this study fell below the minimum desired threshold for a 7-point scale (SD=1.5), suggesting there is less than optimal variability of scores about the mean. To improve the variability among ratings, associated scale items require further review and may need to be rewritten to elicit greater variability in responses.

Lastly, issues related to potential researcher bias and the researcher's limited experience with conducting a mixed methods research study of this magnitude may be limiting factors to this study and its findings. While it is hoped that the data would be collected, analyzed, and interpreted with an unbiased eye, doing so is an impossibility. As a novice researcher, there is increased risk that important findings may have been missed or misinterpreted. Conducting a multi-institutional, mixed methods study brings with it a multitude of data to manage, analyze, and interpret. There is much room for continued analysis of the data, including possibilities for more sophistical inferential statistical analyses such as path analysis with structural equation modeling.

Implications for Research

The scarcity of research related to undergraduate students' motivation to engage with their academic libraries leaves the topic ripe for further investigation. Likewise, considerations of whether or how academic libraries might better serve the everyday life needs of undergraduate students in support of university retention efforts seem to be non-exist in the research literature. As university drop-out rates among undergraduate students remain high across the nation, the intersection between students' potential barriers to their academic success, their information needs and preferences, and university retention from an information science and motivational theory perspective warrants further exploration. Though the findings and conclusions from the present study bring us a step closer towards understanding students and how to support them in their academic journeys as they persist through graduation, further research in this arena is needed. The conceptual model that was proposed for this study (Figure 2) may help guide future

research in this arena. Further, the newly created and/or adapted subscales used in this study were found to produce reliable results and can serve as tools for future research studies. The use of the comprehensive, four phase mixed methods research design that placed the students at the center of the study proved to be an excellent model that not only allowed trends among the data to be revealed, but perhaps more importantly, allowed the voices of the students to be heard. These concepts and recommendations for future research are outlined in greater depth below.

Because this study addressed concepts that have been scarcely addressed in the research literature, much additional work is needed in order to approach generalizable results. As such, additional studies that attempt to replicate the findings of the present study are encouraged. It may also prove useful to conduct similar research studies with undergraduate students attending colleges or universities with different types of institutional classifications such as private institutions, community colleges, and different levels of selectivity, thus presenting opportunities for making comparisons across university type. It is also recommended that future studies include students' "year in school" as a primary demographic factor, as this will allow researchers to assess potential changes over time. If a participant pool was large enough to produce results at a 95% confidence interval, it may prove helpful to implement stratified random sampling to ensure a higher degree of representativeness of all strata or layers in the population, particularly those relating to GPA, racial subgroups, academic major, and enrollment status. Stratified sampling of students in different GPA subgroups may be a particularly useful way to minimize self-reporting or social desirability bias for this measure.

Including different types of data collection methods in the study such as a review of student records, library use statistics, and analysis of transcripts from student drop-out exit interviews may further help to reduce biases inherent with self-reporting methods. Further, it is recommended that GPA data be recorded as interval data rather than categorical as was done in the present study. This may allow for more useful findings to emerge, particularly related to attempts in predicting students' GPAs. Finally, if changes were implemented at a participating university based upon this study's findings and recommendations, it would be interesting to conduct a follow-up study using the same instruments to compare results pre- and post- intervention.

The conceptual model proposed in Figure 2 of this study provides a particularly noteworthy contribution to future research in this field. This model provided a clear framework to guide this study that is based upon sound theoretical research related to information use environments (Taylor, 1991), social cognitive career theory (Lent et al., 1997), Wilson's theory of information seeking (1997), expectancy-value theory of motivation (Eccles & Wigfield, 2002), Tinto's social integration theory (1975), and Savolainen's every life information seeking theory (1995). This model allows for important factors which may be relevant to university retention to be given consideration, especially those related to undergraduate students' (1) contextual, social, and cognitive needs that lead to (2) information seeking behavior, and the (3) motivational factors that come into play that may instigate and sustain student engagement with their library resources. It is important to note that the last line of this model has not yet been tested. This final line proposes that increased engagement with the library will lead to

undergraduate students' everyday life and academic information needs being met (Savolainen, 1995), allowing them to become socially integrated into the university (Tinto, 1975), thereby improving their likelihood of persisting through graduation.

Another important contribution to future research is the undergraduate student survey instrument that was developed and implemented during Phase II of this study. Survey development involved a seven step process proposed by Artino et al. (2014), including steps endorsed by the American Education Research Association (AERA), American Psychological Association (APA), and the National Council on Measurement in Education (NCME) in their 1999 *Standards for Educational and Psychological Testing.* Artino et al. (2014) suggested that "Addressing each of these steps systemically will improve the probability that survey designers will accurately measure what they intend to measure" (p. 463). All scales and subscales in this instrument were found to have good to excellent reliability including those relating to the *expectancy-value theory of motivation* (full scale α = .873; library expectancies for success α = .862; library value α = .920; library cost α = .921), *social cognitive career theory* factors (full scale α = .870; performance goals α not measured, outcome expectations α = .874; academic self-efficacy α = .871) and the *educational barriers* scale (α = .921) and corresponding subscales (support from others α = .847; financial issues α = .744; academic readiness α = .860; social belonging/mental health α = .789). Though each of these scales and subscales were found to have good to excellent reliability, because they have been significantly revised from the original scales identified in the literature, repeated testing of these instruments will produce more credible results. It is also recommended that a subscale

comprised of at least three items be constructed and tested for the social cognitive career factor, *performance goals.* This factor is currently measured by a single item in the survey instrument, thus creating a risk of inconsistent results. Additionally, because there was less than optimal variability among some of the subscales relating to psychosocial factors (e.g., motivation to use the library, social cognitive career factors, and educational barriers), it is recommended that the associated items be rewritten in a way that will elicit more specificity and variability among responses.

Finally, it is recommended that future studies surrounding this complex topic be undertaken using mixed methods designs. The use of the comprehensive, quantitative dominant four phase mixed methods research design that placed the students at the center of the study proved to be an excellent model, as it not only allowed trends among the data to be revealed, but also allowed the voices of the students to be heard. While Olsson (2009) has criticized the library and information science scholarship as "manifest[ing] a task-orientation that is a legacy of the field's origins in library and information system evaluation" (pp. 22-23), mixed methods studies may help move the scholarship forward towards a more user-centered approach. By doing so, undergraduate students will be valued as "knowing subjects" and "cultural experts" (Talja, 1997) and become partners in addressing problems and creating new solutions. In fact, use of student-advisory committees in studies of this nature is recommended, thereby allowing the researchers to gain first-hand insights into student behaviors and perspectives, while also gathering valuable input from students towards creating viable solutions. Individuals who choose to undertake rigorous multi-institutional, mixed methods design studies are further

encouraged to work in teams. Taking a team-based approach will not only help to distribute and manage the immense workload associated with such studies, but will provide additional sets of eyes and perspectives that may further improve the credibility and trustworthiness of the findings.

Implications for Practice

Findings from this study suggest academic libraries are ripe for change. While academic libraries have historically focused upon providing access to highly credible resources to meet students' academic/scholarly information needs, there is a viable place in the campus community for the library to serve in an expanded role as a campus information hub in support of university student retention goals. Successful implementation of such change, however, will require a systems approach in which input from all key stakeholders, including university upper level administrators, faculty, staff, and students is valued. This change may require a realignment of library priorities and resources, rebranding of the library as a center for information and engagement, and significant marketing to ensure success.

According to the expectancy-value theory of motivation, for undergraduates to be motivated to instigate and sustain engagement with their libraries, they must expect to be successful in their library searches and perceive that their engagement will be high on value and low on personal cost. To ensure that students expect success in their library searches, it is critical that continuous efforts are made to ensure they attend two or more library instruction sessions. Findings from this study revealed that students who attended two or more library instruction sessions utilized the library's online resources

significantly more often than those who attended one class or none at all. Likewise, those who attended one library instruction class reported utilizing these resources with significantly greater frequency than those who had never attended a class. Thus, it appears that library instruction may play an important role in a student's willingness to use the library.

Findings from this study suggest undergraduate students' perceptions of library value hold the greatest weight in predicting use of the library's resources. As such, increasing perceptions of library value for students should be a primary consideration. Study findings suggest the physical academic library holds great value for undergraduate students by serving as a space for study and technology access. To further promote engagement with the academic library and the university at large, it is recommended that that library highlight and market the services, resources, and spaces that are available to promote students' curation and creation of their own content such as is possible via scholarly commons, media commons, and makerspaces. Further, because recent trends suggest an educational shift is beginning to occur throughout the United States, moving from an emphasis on science, technology, and math (STEM) to STEAM: "Science & Technology, interpreted through Engineering & the Arts, all based in Mathematical elements an emphasis on science, technology, and math" (STEAM Education, 2015), libraries must consider how to support and engage students in these efforts through their space, resources, and services.

The online scholarly resources available through the library's website hold particular value for undergraduate students when they are required by their professors to

use them in order to earn favorable grades. When not required to use such scholarly materials, the perceived value of the library's online resources is minimal at best. What many students may not realize, however, is the vast array of online resources that are already in place at the library which may, in fact, bring value to them beyond completing their course assignments. For example, 78.25% of undergraduate student survey participants indicated with a rating of 5, 6, or 7 (7-point scale) that they would use career information if it was available at the library. Phase IV library website review findings revealed that 58% of libraries had career information compiled for their students in subject guides. Likewise, 78.84% of survey participants indicated with a rating of 5, 6, or 7 that they would use pre-selected materials for their courses or subject area if provided by the library. This time, 96.0% of library websites reviewed already had research guides in place to support students in particular majors or courses. These findings suggest that fulfilling some of the information needs revealed in this study may be accomplished with minimal effort on the part of libraries by using a targeted marketing approach to make sure students are aware of and know how to access these valuable resources.

Further, 75.88% of students indicated with a rating of 5, 6, or 7 that they would utilize the ability to search Google and the library at the same time if it were available. Google Scholar may be a resource that could fulfill this information preference for students. Google Scholar enables a researcher to search specifically for scholarly literature, allowing the researcher to "search across many disciplines and sources: articles, theses, books, abstracts and court opinions, from academic publishers, professional societies, online repositories, universities and other web sites," oftentimes allowing the

researcher to locate the complete, full-text document through their library or on the web (Google Scholar, n.d.). Of the library websites reviewed, 8% (n=4) provided direct access to Google Scholar from the library's homepage, while 70% (n=35) provided this link from their list of library databases. Making Google Scholar a more accessible resource for students may be as simple as placing a link directly on the library's homepage.

Another largely untapped opportunity to build perceptions of library value relates to providing information to help meet students' everyday life needs. Students, librarians, and enrollment and retention officers all expressed the need for students to have increased awareness of and better understanding about how to access campus support services. Undergraduate students also noted that the greatest perceived barriers to their educational success related to their academic readiness, finances, social belonging, and feeling supported by others. If these barriers were translated into information needs, then the concept of the library as a campus information hub could conceivably help to address these needs by providing resources and directing students to support mechanisms that are already in place on the university campus. This is not to suggest that the library should provide services to students that are traditionally provided by other campus units (e.g., advising, career counseling, financial aid, tutoring, etc.), but rather to serve as an information clearinghouse, pointing students to the information or support units they may need. In addition, it is recommended that student support units, including the library, collaborate more actively with each other in order to provide a triage approach in which all units value and know about each other's services. This would allow reciprocal

referrals across units, thereby engaging a strategic campus approach in support of meeting student needs.

The third factor relating to the expectancy-value theory of motivation is cost. For students to be motivated to engage with library resources, the perceived cost must be minimal. In other words, libraries must work to make their systems easy to use and are encouraged to consider adopting web scale discovery tools that offer a more "Google like" searching experience. Web scale discovery services are "capable of searching quickly and seamlessly across a vast range of local and remote content and providing relevancy-ranked results in the type of intuitive interface that today's information seekers expect" (American Library Association, n.d.). Fortunately, 76.0% of academic library websites reviewed already had this type of feature available, described in this study as "one search box" to search all types of library resources. Similarly, undergraduate student survey participants (75.86% rated as a 5, 6, or 7) indicated that they would prefer the ability to use natural search language rather than Boolean search operators when conducting library searches. Again, findings from the Phase IV library website review revealed that 74.0% of the libraries had search tools currently in place that allowed for natural language searching. This suggests that libraries are beginning to recognize the value such searching tools and features offer to their students by creating user-friendly search interfaces that hold minimal "cost" for students. These are but a mere smattering of the practical suggestions that can be gleaned from this study. Further consideration should be given to the demographic differences noted throughout the study and how they may implicate a need for further change across the university and within the library.

Finally, from a university standpoint, it is recommended that the survey instrument that was developed for and implemented in Phase II of this research study be distributed across an institution's entire student body. The findings that could be gleaned from such a campus-wide student survey could be used to gauge the information needs, preferences, educational barriers, social cognitive and career factors, and motivational perspectives across an entire study body. This could allow support units to better understand the needs of their students and cater their services in meaningful ways in support of the university goal of retaining students through graduation.

Conclusions

In this era of shrinking budgets, higher education institutions across the United States are asked to do more with less. This has come at a time when the current presidential administration is calling for the education of every American (White House, 2009). While Americans are enrolling in colleges and universities at higher rates than ever before, attrition remains high. Maintaining student enrollment through graduation has become a high stakes endeavor for colleges and universities as loss of students through attrition directly affects institutional budgets through reductions in both the tuition revenue stream and performance based funding resources.

Tinto (1975) posits that student engagement plays an important role in a student's decision to persist or drop out of college. The academic library is poised to play an important role in engaging and retaining students, though not without a disruption to the status quo. The issue at hand, then, becomes one of the relevance of academic libraries for their undergraduate populations. To become more relevant to undergraduate students,

libraries must consider that it is time for a paradigm shift in order to increase the intersection of what the library offers with what undergraduates want, need, and prefer. This new paradigm will require the library to reinvent itself by creating systems around user needs and preferences. Further, to facilitate adoption of these library resources, users must feel that they will be successful when engaging with such resources, perceive that the resources are valuable to them both personally and academically, and be of minimal "cost" to them in terms of convenience, efficiency, and satisfaction. Rather than perceive that the academic library is in competition with Google and other search engines, it should instead be considered as a resource for carefully vetted information in support of student success and retention. Thus, as universities consider ways to engage and retain their students, they may benefit by reimagining the University Library as the information hub of the university that attends holistically to the information needs of students.

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APPENDIX A

INVITATION TO UNIVERSITY LIBRARIANS/DEANS

Date

Dear (Dean of Library),

Greetings! Dr. Clara M. Chu, a member of my doctoral dissertation committee, suggested I contact you regarding my research. I am doctoral candidate at The University of North Carolina at Greensboro (UNCG), pursuing a PhD in Educational Studies with a research focus on undergraduate students' digital information seeking. I am preparing to launch a multi-institutional dissertation research study and invite you to consider collaborating. I plan to work with four large public universities distributed across the four quadrants of the United States. Dr. Chu thought (name of university) may be a good fit for this study.

In support of university retention goals, my dissertation seeks to gain a deeper understanding of why undergraduate students are turning to sources beyond the academic library to meet their information needs and to explore ways by which to reverse these trends. A more complete overview of the study is available via this poster that I recently presented at the Association for Library and Information Science Education (ALISE) 2016 conference in Boston earlier this year.

Data collection for this study will include: (1) interviews with university retention officers, librarians, and undergraduate students at each university, (2) online surveys distributed to a randomly selected pool of undergraduate students at each university, (3) follow-up interviews with undergraduate volunteers (from the survey), and (4) an analysis of 102 academic library websites to compare what students want, need, and prefer regarding information seeking to what university libraries offer.

My desired end products from this study include:

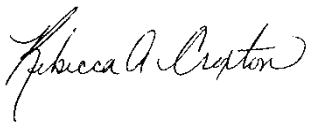
- Written dissertation
- Reports prepared for **each participating university** regarding the findings with a proposed model for engaging students with their academic library in support of university retention efforts.
- A survey instrument that can be used by other libraries to measure information seeking needs, preferences, and motivation of undergraduate students.

Your collaboration with my research would involve (1) helping me to gain permission to conduct research at your university, (2) suggesting who I may talk with from your pool of librarians to learn more about your students' information seeking needs, preferences, and motivation, (3) recommending individuals I might contact to learn more about your university's retention efforts, and (4) introducing me to the appropriate university personnel or resources to gain access to a randomly selected pool of undergraduate students to invite to complete an online survey.

This study has been approved by UNCG's Office of Research and Compliance and is determined to be exempt from further review under 45 CFR 46.101(b). To include your university in this study, I would need a letter of support from you to include in an IRB modification. Once that is in place, I then hope to work with your university's IRB office to gain permission to conduct research at your institution.

I sincerely appreciate your consideration. I would be happy to discuss the project further at any time. I can be reached via email (racroxto@uncg.edu) or via my cell phone: 704-661-3638. I also encourage you to visit my online portfolio to learn more about my research and background: https://rebeccacroxton.wordpress.com/

Kindest Regards,



Rebecca A. Croxton, MLIS
Doctoral Candidate
The University of North Carolina at Greensboro – School of Education
Department of Teacher Education & Higher Education
Department of Library & Information Studies
1300 Spring Garden Street
School of Education Building
Greensboro, North Carolina 27402-6170

APPENDIX B

INVITATION TO ACADEMIC LIBRARIANS

Dear (Name of Librarian),

Greetings! (Name of Library Dean) suggested I contact you to invite you to participate in an interview relating to my dissertation research. I am doctoral candidate at the University of North Carolina at Greensboro (UNCG), pursuing a PhD in Educational Studies with a research focus on undergraduate students' digital information seeking. In support of university retention goals, my dissertation study seeks to gain a deeper understanding of why undergraduate students are turning to sources beyond the academic library to meet their information needs and to explore ways by which to reverse these trends. A more complete overview of the study is available via this poster that I recently presented at the Association for Library and Information Science Education (ALISE) 2016 conference in Boston earlier this year.

As part of this study, I would like to conduct interviews with academic librarians who are particularly knowledgeable about undergraduate students' information seeking needs, preferences, and motivation to use the library. Specifically, I hope to explore how the university might increase student engagement with the library, particularly for students who may be vulnerable to dropping out. The interview is expected to last approximately 30 minutes.

Would you be willing to participate in an interview with me about this topic? I have a great deal of flexibility to meet either in person, via phone, or video conference and am happy to accommodate your schedule.

I sincerely appreciate your consideration. For more information about my research interests and background, please feel to visit my online portfolio.

Kindest regards,

Rebecca Croxton, MLIS
UNCG School of Education
TEHE/LIS Doctoral Candidate

APPENDIX C

INVITATION TO ENROLLMENT AND RETENTION OFFICERS

Dear (Name of Official):

Greetings! I am doctoral candidate at the University of North Carolina at Greensboro (UNCG), pursuing a PhD in Educational Studies with a research focus on undergraduate students' digital information seeking. In support of university **retention goals** across the country, my multi-institution dissertation study seeks to gain a deeper understanding of why undergraduate students are turning to sources beyond the academic library to meet their information needs and to explore ways by which to reverse these trends. A more complete overview of the study is available via this poster that I recently presented at the Association for Library and Information Science Education (ALISE) 2016 conference in Boston earlier this year.

As part of this study, I would like to conduct interviews with key leaders of the university who have a deep understanding of students who are particularly vulnerable to dropping out of the university. Specifically, I hope to explore how the university library may help to meet the needs of these students from an information science perspective. The interview is expected to last approximately 30 minutes.

Would you be willing to participate in an interview with me about this topic? I have a great deal of flexibility to meet either by phone or video conference and am happy to work around your schedule.

I sincerely appreciate your consideration. For more information about my research interests and background, please feel to visit my online portfolio.

NOTE: This study has been approved by UNCG's Office of Research and Compliance and is determined to be exempt from further review under 45 CFR 46.101(b).

Kindest Regards,

Rebecca A. Croxton, MLIS
Doctoral Candidate, UNCG School of Education

APPENDIX D

INVITATION TO FRESHMAN STUDENTS

Greetings! (Name of Librarian at University), suggested I invite you to participate in an interview relating to my dissertation research. I am doctoral candidate at the University of North Carolina at Greensboro (UNCG), pursuing a PhD in Educational Studies with a research focus on undergraduate students' digital information seeking.

I am conducting a dissertation research study about undergraduate students' information seeking needs, preferences, and motivation to use the library and (name of librarian) thought you may have some insights that would be particularly valuable to this study. A more complete overview of this study is available via this online poster.

Would you be willing to participate in an interview with me about this topic? The interview is expected to last approximately 30 minutes. I have a great deal of flexibility to meet either by phone or video conference and am happy to accommodate your schedule. As a token of appreciation for participation, I will mail you a **$10 Amazon Gift Card** at the conclusion of the interview.

If you are interested in participating in an interview, please let me know via email: racroxto@uncg.edu. Please also indicate your class level in the email (e.g., freshman, sophomore, etc.)

I sincerely appreciate your consideration. For more information about my research interests and background, please feel to visit my online portfolio.

Kindest regards,
Rebecca Croxton, MLIS
UNCG School of Education
TEHE/LIS Doctoral Candidate

APPENDIX E

SURVEY PARTICIPANT DEMOGRAPHICS

	Aggregate n (%)	Univ 1 n (%)	Univ 2 n (%)	Univ3 n (%)
First Gen. Student				
Yes	294 (23.0)	26 (24.3)	149 (19.4)	119 (29.6)
No	971 (76.0)	81 (75.7)	613 (79.8)	277 (68.9)
Not Sure	12 (0.9)	0 (0.0)	6 (0.8)	6 (1.5)
Gender				
Male	390 (34.2)	31 (38.8)	200 (39.4)	59 (22.7)
Female	547 (64.6)	47 (58.8)	30 (60.2)	195 (75.0)
Other	10 (1.2)	2 (2.5)	2 (0.4)	6 (2.3)
Race				
AmIn/AlaskaNat	5 (0.6)	1 (1.3)	4 (0.8)	--
Asian/Haw/P.I.	147 (17.4)	1 (1.3)	133 (26.2)	13 (5.0)
Black/Af Am	71 (8.4)	--	12 (2.4)	59 (22.8)
White (Cauc)	506 (59.7)	69 (86.3)	286 (56.3)	151 (58.3)
White (Hisp)	54 (6.4)	5 (6.3)	34 (6.7)	15 (5.8)
2 or More	44 (5.2)	4 (5.0)	25 (4.9)	15 (5.8)
Other	20 (2.4)	--	14 (2.8)	6 (2.3)
Age				
18-24 years	754 (89.0)	64 (80.0)	495 (97.6)	195 (75.0)
25-64 years	88 (6.7)	16 (20.0)	11 (2.2)	61 (23.5)
65+ years	1 (0.1)	--	1 (0.2)	--
Prefer not to say	4 (0.3)	--	--	4 (1.5)
Enrollment Status				
FT-Campus	744 (88.0)	75 (93.8)	473 (93.5)	196 (75.7)
FT-Online	31 (3.7)	3 (3.8)	3 (0.6)	25 (9.7)
PT-Campus	39 (4.6)	2 (2.5)	22 (4.3)	15 (5.8)
PT-Online	17 (2.0)	--	1 (0.2)	16 (6.2)
Other	14 (1.7)	--	7 (1.4)	7 (2.7)
Major				
Arts/Human	100 (13.0)	19 (24.1)	47 (9.3)	44 (17.0)
Social Sciences	147 (17.4)	16 (20.3)	82 (16.2)	49 (18.9)
Math, Sc, Tech	227 (26.9)	17 (21.5)	184 (36.4)	26 (10.0)
Business	131 (15.5)	5 (6.3)	81 (16.0)	45 (17.4)
Hlth/Hum Svc	122 (14.5)	10 (12.7)	40 (7.9)	72 (27.8)
Double (cross dis)	51 (6.0)	5 (6.3)	29 (5.7)	17 (6.6)
Undeclared	18 (2.1)	1 (1.3)	16 (3.2)	1 (0.4)
Other	38 (4.5)	6 (7.6)	27 (5.3)	5 (1.9)

	Aggregate n (%)	Univ 1 n (%)	Univ 2 n (%)	Univ3 n (%)
GPA				
3.6-4.0	352 (42.3)	36 (45.6)	235 (47.0)	81 (31.9)
3.1-3.5	291 (34.9)	28 (35.4)	183 (36.6)	80 (31.5)
2.6-3.0	136 (16.3)	11 (13.9)	66 (13.2)	59 (23.2)
2.1-2.5	41 (4.9)	3 (3.8)	15 (3.0)	23 (9.1)
2.0 or below	13 (1.6)	1 (1.3)	1 (0.2)	11 (4.3)
Family Income (yr)				
< $20K	76 (9.0)	12 (15.2)	22 (4.3)	42 (16.2)
$20K – $34,999	80 (9.5)	10 (12.7)	32 (6.3)	38 (14.7)
$35K - $49,999	88 (10.4)	6 (7.6)	45 (8.9)	37 (14.3)
$50K - $74,999	113 (13.4)	10 (12.7)	68 (13.4)	35 (13.5)
$75K - $99,999	104 (12.3)	7 (8.9)	72 (14.2)	25 (9.7)
$100K +	220 (26.0)	1 (19.0)	177 (34.9)	28 (10.8)
Not Sure	164 (19.4)	19 (24.1)	91 (17.9)	54 (20.8)
Parents' Education				
No HS Diploma	22 (2.6)	1 (1.3)	11 (2.2)	10 (3.9)
HS Grad/Equiv	104 (12.3)	11 (13.8)	50 (9.9)	43 (16.6)
Some college	84 (9.9)	15 (18.8)	27 (5.3)	42 (16.2)
Trade/Voc Trng	21 (2.5)	3 (3.8)	11 (2.2)	7 (2.7)
Assoc Degree	59 (7.0)	4 (5.0)	24 (4.7)	31 (12.0)
Bachelor's Deg	229 (27.1)	21 (26.3)	140 (27.6)	68 (26.8)
Master's Degree	212 (25.1)	16 (20.0)	159 (31.4)	37 (14.3)
Doctoral Deg	101 (11.9)	9 (11.3)	75 (14.8)	17 (6.6)
Other	14 (1.7)	--	10 (2.0)	4 (1.5)
ESL				
Yes	219 (25.9)	4 (5.0)	172 (34.0)	43 (16.7)
No	62 (74.1)	76 (95.0)	625 (74.1)	215 (83.3)
Internat'l Student				
Yes	50 (5.9)	--	44 (8.7)	6 (2.3)
No	794 (94.1)	79 (100)	463 (91.3)	252 (97.7)
Lib. Class Attended				
Yes – 1 class	351 (29.8)	225 (31.1)	21 (22.3)	105 (29.2)
Yes – 2 or more	240 (20.4)	113 (15.6)	20 (21.3)	107 (29.7)
No – 0 classes	561 (47.6)	368 (50.8)	51 (54.3)	142 (39.4)
Not Sure	26 (2.2)	18 (2.5)	2 (2.1)	6 (1.7)

APPENDIX F

STUDENT INTERVIEW PROFILES

ID	Univ.	Gender	Race	Year in School	GPA	First Gen	ESL	Major	Age	# Lib Class	LibUse In-Pers	LibUse Online
S1	3	Male	Black	Fresh	N/A	No	No	STEM	18-24	0	1-2/wk	N/A
S2	3	Female	White	Fresh	N/A	No	No	Soc Sc	18-24	0	1-3/mo	0/sem
PS1	2	Male	Other	Fresh	2.1-2.5	No	Yes	Double	18-24	1	<5/sem	<5/sem
PS2	2	Female	Hisp/Lat	Junior	3.1-3.5	Yes	Yes	STEM	18-24	2+	1-2/wk	1-2/wk
PS3	3	Male	White	Junior	3.6-4.0	Yes	No	Health	25+	1	0/sem	1-3/mo
PS4	1	Female	White	Soph	3.1-3.5	Yes	No	Health	18-24	1	<5/sem	<5/sem
PS5	3	Female	Black	Senior	3.1-3.5	Yes	No	STEM	18-24	1	1-2/wk	3+/wk
PS6	3	Female	White	Fresh	2.6-3.0	No	No	Soc Sc	18-24	2+	1-3/mo	<5/sem
PS7	2	Female	Other	Fresh	3.6-4.0	Yes	No	Soc Sc	18-24	1	<5/sem	1-3/mo
PS8	2	Male	White	Senior	2.6-3.0	No	No	Art/Hum	18-24	1	<5/sem	<5/sem
PS9	1	Male	White	Junior	3.6-4.0	No	No	Double	18-24	1	1-2/wk	<5/sem
PS10	1	Male	White	Fresh	3.6-4.0	No	No	STEM	18-24	0	Daily	1-3/mo
PS11	1	Male	White	Senior	2.6-3.0	No	No	Art/Hum	18-24	2+	<5/sem	<5/sem
PS12	2	Female	White	Soph	3.6-4.0	No	No	Business	18-24	2+	1-2/wk	1-3/mo
PS13	3	Male	Other	Soph	= < 2.0	No	No	Health	18-24	1	1-3/mo	<5/sem
PS14	3	Female	Hisp/Lat	Fresh	2.6-3.0	No	No	Health	18-24	1	1-2/wk	0/sem
PS15	3	Female	Black	Fresh	2.1-2.5	No	No	Soc Sc	18-24	1	Daily	Daily
PS16	1	Other	White	Soph	3.1-3.5	No	No	Art/Hum	18-24	1	0/sem	0/sem
Total	Un1(n=5) Un2(n=5) Un3(n=8)	M (n=8) F (n=9) O (n=1)	Wht (n=10) Blck (n=3) Hisp (n=2) Other (n=3)	Frsh(n=8) Soph(n=4) Jr. (n=3) Sr. (n=3)	=< 2.0 (n=1) 2.1-2.5 (n=2) 2.6-3.0 (n=4) 3.1-3.5 (n=4) 3.6-4.0 (n=5) N/A (n=2)	Y(n=5) N(n=13)	Y(n=2) N(n=16)	Art/Hm(n=3) Bus (n=1) Hlth (n=4) Soc Sc (n=4) STEM (n=4) Double (n=2)	18-24(n=17) 25+(n=1)	0 (n=3) 1(n=11) 2+(n=4)	0/sem (n=2) <5/sem (n=5) 1-3/mo (n=3) 1-2/wk (n=6) Daily (n=2)	0/sem(n=3) <5/sem(n=7) 1-3/mo(n=4) 3+/wk(n=1) 1-2/wk(n=1) Daily (n=1)

APPENDIX G

PHASE IV UNIVERSITY PROFILES

ID	Geographic Location	Undergraduate Program*	Selectivity*
Univ1	West	Balanced arts & science/prof	Selective
Univ2	Midwest	Balanced arts & science/prof	More selective
Univ3	Southeast	Balanced arts & science/prof	Selective
Univ4	Northeast	Arts & sciences plus professions	Selective
Univ5	Midwest	Professions plus arts & sciences	Selective
Univ6	Southeast	Arts & sciences plus professions	More selective
Univ7	Northeast	Balanced arts & science/prof	Selective
Univ8	Southeast	Professions plus arts & sciences	Selective
Univ9	Southwest	Balanced arts & science/prof	More selective
Univ10	Southeast	Professions plus arts & sciences	Selective
Univ11	West	Arts & sciences focus	More selective
Univ12	Southeast	Balanced arts & science/prof	Selective
Univ13	Northeast	Balanced arts & science/prof	More selective
Univ14	Southeast	Balanced arts & science/prof	Selective
Univ15	Southeast	Balanced arts & science/prof	Selective
Univ16	West	Balanced arts & science/prof	Selective
Univ17	West	Arts & sciences focus	More selective
Univ18	Southeast	Balanced arts & science/prof	Not Available
Univ19	Southeast	Balanced arts & science/prof	Selective
Univ20	West	Arts & sciences plus professions	More selective
Univ21	Midwest	Professions plus arts & sciences	Selective
Univ22	West	Arts & sciences focus	More selective
Univ23	Northeast	Balanced arts & science/prof	Inclusive
Univ24	Midwest	Professions plus arts & sciences	Selective
Univ25	Northeast	Balanced arts & science/prof	More selective
Univ26	Southeast	Professions plus arts & sciences	Selective
Univ27	Midwest	Professions plus arts & sciences	Selective
Univ28	Southeast	Professions plus arts & sciences	More selective
Univ29	Midwest	Balanced arts & science/prof	More selective
Univ30	Southeast	Professions plus arts & sciences	Selective
Univ31	Southeast	Professions plus arts & sciences	More selective
Univ32	Midwest	Balanced arts & science/prof	Selective
Univ33	West	Arts & sciences plus professions	More selective
Univ34	Midwest	Balanced arts & science/prof	More selective

ID	Geographic Location	Undergraduate Program*	Selectivity*
Univ35	Southeast	Professions plus arts & sciences	More selective
Univ36	West	Balanced arts & science/prof	Selective
Univ37	Northeast	Balanced arts & science/prof	More selective
Univ38	Midwest	Professions plus arts & sciences	Selective
Univ39	Southeast	Professions plus arts & sciences	More selective
Univ40	Midwest	Professions plus arts & sciences	Selective
Univ41	Midwest	Arts & sciences plus professions	More selective
Univ42	Southwest	Balanced arts & science/prof	Selective
Univ43	Northeast	Balanced arts & science/prof	Selective
Univ44	Midwest	Balanced arts & science/prof	More selective
Univ45	Southeast	Balanced arts & science/prof	More selective
Univ46	Northeast	Balanced arts & science/prof	More selective
Univ47	Southwest	Balanced arts & science/prof	More selective
Univ48	Midwest	Balanced arts & science/prof	Selective
Univ49	Southeast	Professions plus arts & sciences	More selective
Univ50	West	Arts & sciences plus professions	More selective

*Profiles based on Carnegie Foundation Classifications (2015)

APPENDIX H

RESEARCH CROSSWALK

<table>
<tr><td colspan="7">RQ1: What motivational variables best predict library utilization by undergraduate students?
• Proposition 1: Motivational variables are predictive of undergraduate students' utilization of academic library resources.
• Proposition 2: Group differences exist among undergraduate students with respect to their utilization of academic library resources.</td></tr>
<tr><td>Construct:</td><td colspan="6">Motivation</td></tr>
<tr><td>Importance to Study:</td><td colspan="6">Motivation to use library resources has been little explored in the library and information seeking literature, but may be an important component to undergraduates' willingness to use academic library online resources in their everyday life and academic information seeking.</td></tr>
<tr><td>"Diction." Definition:</td><td colspan="6">The "process whereby goal-directed activity is instigated and sustained" (Schunk, Pintrich, & Meece, 2008, p. 4).</td></tr>
<tr><td>"Oper." Definition:</td><td colspan="6">Motivation = Motivation_Expect + Motivation_Value - Motivation_Cost</td></tr>
<tr><td>Dependent & Indepen. Variables</td><td colspan="6">Dependent Variable(s): LibUse_Online and LibUse_Building
Independent Variables:
• Motivation = Motivation_Expect + Motivation_Value – Motivation_Cost</td></tr>
<tr><td>Data Analysis Plan:</td><td colspan="6">• Proposition 1: Multiple Regression & Thematic Analysis of Interview Data
• Proposition 2: ANOVAs & Thematic Analysis of Interview Data</td></tr>
<tr><td>Data Collection Strategies:

(See data collection instruments for further info.)</td><td>Reten. Inter.

Not address.</td><td>Fresh. Inter. (Pre-Survey)

#16-23</td><td>Lib. Inter.

#12-20</td><td>Undergrad Student Survey

Constructs:
Expectanc.
9 (3 item)

Value
10 & #11
10.1-10.6
11.7-11.8

Cost
#11 (5 item)
11.9-11.13</td><td>Undergrad Follow-up Inter.

#19-24</td><td>Lib Web. Rev.

Not address.</td></tr>
</table>

<table>
<tr><td colspan="7">RQ2: What are the social cognitive information needs of successful students?
• Proposition 3: There are common educational barriers among undergraduate students.
• Proposition 4: Group differences exist among undergraduate students with respect to their common educational barriers.
• Proposition 5: Undergraduate students' contextual background and social cognitive factors are predictive of their utilization of utilize academic library resources.
• Proposition 6: Undergraduate students' contextual background and social cognitive factors are predictive of their overall academic success.</td></tr>
<tr><td>Construct:</td><td colspan="6">Social_Cognitive_Total</td></tr>
<tr><td>Importance to Study:</td><td colspan="6">The Social Cognitive Career Theory has found to be successful in predicting students' likelihood of academic persistence. SCCT takes into consideration academic ability, background, outcome expectations, academic self-efficacy, & perf. goals.</td></tr>
<tr><td>"Diction." Definition:</td><td colspan="6">Everyday life information seeking consists of collecting materials for helping to answer information needs that arise during the course of one's daily life (Savolainen, 1995).</td></tr>
<tr><td>"Oper." Definition:</td><td colspan="6">Social Cognitive Total = SCCT_Performance Goals + SCCT_Outcome_Expectations + SCCT_AcadSelfEfficacy – EdBar</td></tr>
<tr><td>Dependent & Indepen. Variables</td><td colspan="6">Dependent Variables
• Academic Success = GPA
• Library Use = LibUse_Online and LibUse_Building</td></tr>
<tr><td>Data Analysis Plan:</td><td colspan="6">Proposition 3: Frequency counts from survey data of educational barriers & frequency counts of quantitized interview results.
Proposition 4: ANOVAs from survey results
Proposition 5: Multiple Regression & Thematic Analy.Interview Data
Proposition 6: Multiple Regression & Thematic Analy.Interview Data</td></tr>
<tr><td>Data Collection Strategies:

(See data collection instruments for further info.)</td><td>Reten. Inter.

#1-8</td><td>Fresh. Inter. (Pre-Survey)

#1-7</td><td>Lib. Inter.

#1-7</td><td>Undergrad Student Survey

Construct: Perf Goals
#20.1</td><td>Undergrad Follow-up Inter.

#1-9</td><td>Lib Web. Rev.

Not address.</td></tr>
</table>

				Outcome Expect #20.2-20.6 Open #21 **Acad Self-Eff** #22.1-22.5 Open #23 **Academic Barr Subscales** **Lack of Soc Support** #27.4, 27.6, 27.12, 28.11 – 29.13, 28.16 **Finan, Iss.** #27.1, 27.2, 28.17 **Lack Acad Readiness** #27.3, 27.7, 27.8, 28.20, 28.30 **Not Fit-In** #27.5, 27.10-27.11, 28.14 Open #29		

<table>
<tr><td colspan="7">RQ3: How do undergraduate students prefer to meet their information needs?
• Proposition 7: There are commonalities among undergraduate students with respect to the types of information resources they prefer to use for information seeking.
• Proposition 8: There are commonalities among undergraduate students with respect to the types of technology they prefer to use for information seeking.
• Proposition 9: Group differences exist among undergraduate students with respect to their preferences for information seeking.</td></tr>
<tr><td>Construct:</td><td colspan="6">Res_Pref_ELIS, Res_Pref_Acad, Tech_Pref_ELIS, Tech_Pref_Acad</td></tr>
<tr><td>Importance to Study:</td><td colspan="6">By developing a clear picture of how students prefer to meet their information needs (resources & technology tools), libraries can better tailor their services to meet students' information needs.</td></tr>
<tr><td>"Diction." Definition:</td><td colspan="6">Preference, as defined by Merriam Webster (2015) is something that is liked or wanted more than another thing.</td></tr>
<tr><td>"Oper." Definition:</td><td colspan="6">Information seeking preferences is assessed using the four individual constructs identified for this research question (Res_Pref_ELIS, Res_Pref_Acad, Tech_Pref_ELIS, Tech_Pref_Acad</td></tr>
<tr><td>Data Analysis Plan</td><td colspan="6">• Proposition 7: Descriptive Statistics/Frequencies/Percentages – from quantitative survey data/Rankings of top choices
• Proposition 8: Descriptive Statistics/Frequencies/Percentages – from quantitative survey data/Rankings of top choices
• Proposition 9: ANOVAs</td></tr>
<tr><td>Data Collection Strategies:

(See data collection instruments for further info.)</td><td>Reten. Inter.

Not address.</td><td>Fresh. Inter. (Pre-Survey)

#8-11</td><td>Lib. Inter.

#8-11</td><td>Undergrad Student Survey

Info Source ELIS Pref
#16 (23 items)
Open #17

Acad Pref
#18
(24 items)
Open #19

Tech Pref ELIS Pref
#31(7 items)
Open #33

Acad Pref
#32 (7items)
Open #33</td><td>Undergrad Follow-up Inter.

#10-13</td><td>Lib Web. Rev.

Not address.</td></tr>
</table>

<table>
<tr><td colspan="7">RQ4: To what extent is addressing the everyday life information needs of students a viable option for academic libraries?
• Proposition 10: There is a clear overlap between the everyday life information needs of undergraduate students and the ability of academic libraries to meet these needs.</td></tr>
<tr><td>Construct:</td><td colspan="6">ELIS_Lib_Viability</td></tr>
<tr><td>Importance to Study:</td><td colspan="6">Earlier research questions will help to identify what is important to students with regard to info seeking. A review of current academic library websites will help to identify what libraries currently have. This RQ will address the alignment between what students want and what libraries have and explore how libraries might address alignment between libraries and users in a way that can be feasibly carried out by libraries and univ. in support of retention.</td></tr>
<tr><td>“Diction.” Definition:</td><td colspan="6">Viability - Capability of succeeding</td></tr>
<tr><td>“Oper.” Definition:</td><td colspan="6">Comparison of what students want with respect to meeting their information needs and what libraries have. How closely are they aligned? What can be done to bring alignment closer to ensure student success in a way that is doable for libraries?</td></tr>
<tr><td>Data Analysis Plan</td><td colspan="6">• Thematic analysis of qualitative data
• Descriptive statistics – means, frequency counts, percentages of features from library checklist
• Comparison of student needs, preferences, and motivation to features from library checklist for alignment</td></tr>
<tr><td>Data Collection Strategies:

(See data collection instruments for further info.)</td><td>Reten. Inter.

Questions 9-12</td><td>Fresh. Inter. (Pre-Survey)

Questions 24-25</td><td>Lib. Inter.

Questions 21-24</td><td>Undergrad Student Survey

Likelihood of use-Lib services, tools, features:
• #13 & 14 (list of 18 items)
• Open #15</td><td>Undergrad Follow-up Inter.

Questions 26-27</td><td>Lib Web. Rev.

45 item check-list</td></tr>
</table>

APPENDIX I

LIBRARIAN INTERVIEW PROTOCOL

RQ2: What are the social cognitive information needs of successful students?

1. What do you think are some of the most common **everyday** life information needs of undergraduate students? Everyday life information needs are those that arise during the course of a student's daily life.

2. What do you think are some of the most common **academic** information needs of undergraduate students? Academic information needs are those that arise when completing a course related assignment or research paper.

3. What do you think are some of the most **common stressors** for freshman students?

4. Are there any particular trends you've noticed for why some students drop out and others do not?

5. From an information standpoint, can you think of any particular types of information or services that the university or library may be able to provide undergraduate students to help meet their needs (e.g., tutoring, instructional support, etc.)

6. Can you think of any information that the university and/or library may be able to provide students who may be vulnerable to dropping out that may help retain them?

7. Have you noticed that some student demographic groups have different information needs/retention issues compared to others? Please describe.

RQ3: How do undergraduate students prefer to meet their information needs?

8. What do you think are the most common "go to" information **sources** undergraduate students use to answer questions that come up in their **everyday lives**?
   - Why do you think students tend to gravitate to these resources over others?

9. What do you think are the most common "go to" information **sources** they use when completing **course related assignments** or research papers?
   - Why do you think students tend to gravitate to these resources over others?

10. What do you think are the most frequently used **technology tools** that students use to access the Internet for their **everyday life** information seeking?
    - Why do you think this is?

11. What do you think are the most frequently used **technology tools** that students use to access the Internet for their **course related** research?
    - Why do you think students gravitate towards this type of technology over others?

RQ1: What motivational variables best predict library utilization by undergraduate students?

12. In general, how would you describe undergraduate students' **attitudes** about using the library?

13. How would you describe their **motivation** to use the **physical library**?
    - How about the library's **online resources**?

14. In general, do you think students **expect** to be successful in finding what they need when they are required to use the library? Please elaborate.

15. How would you describe their **confidence** in using the library's online resources?

16. When undergraduate students use the **physical library**, what do you think prompts them to do so?

17. When these students use the library's **online resources**, why do you think they do so?

18. Research findings from a large-scale international study on library trends (De Rosa et al., 2011) suggest search engines dominate among college students as the electronic source used to find online content (93%), while results show an overall decline in use of library web sites, electronic journals, and online databases between 2005 and 2010.
    - Have you noticed this trend occurring at your university?
    - Why do you think this is (or why do you think things are different at your university than in the national trends)?

19. Based upon your experiences in working with undergraduate students, have you noticed that some student demographic groups are more motivated than others to use the academic library's online resources?
    - If so, what are some differences that you have noticed?
    - Why do you think these differences exist?

20. What are some things that might motivate students to use the library's online resources? Ask further probing questions as necessary.

RQ4: To what extent is addressing the everyday life information needs of students a viable option for academic libraries?

21. Have you noticed any **current trends** at your library – now as compared to five years ago?

22. What do you think the **future trends** are for undergraduate libraries and undergraduate students?
    - How do you envision the library might evolve to meet these trends?

23. Do you think the library can play a greater role in helping to address both the **everyday life** and **academic needs** of students?
    - How do you envision this could play out?
    - Do you have any thoughts about how the library might better serve students who are vulnerable to dropout?

24. If the library had easily accessible information to campus resources and other information to help students to address everyday life things (e.g., financial issues, career information, academic preparation skills, confidence, health/wellness, ways to connect with other students on campus, information about childcare for students with children…) do you think students would use it?
    - Why or why not?

APPENDIX J

RETENTION OFFICER INTERVIEW PROTOCOL

RQ2: What are the social cognitive information needs of successful students?

1. What do you think are some of the most common **everyday** life information needs of undergraduate students? Everyday life information needs are those that arise during the course of a student's daily life.

2. What do you think are some of the most common **academic** information needs of undergraduate students? Academic information needs are those that arise when completing a course related assignment or research paper.

3. What do you think are some of the most **common stressors** for freshman students?

4. Are there any particular trends you've noticed for why some students drop out and others do not?

5. What do you think makes some students more successful than others?

6. From an information standpoint, can you think of any types of information or services that the university or library may be able to provide undergraduate students to meet their needs? (e.g., tutoring, tech support, instructional technology,)
    - In the information age, do you think libraries need to evolve to support these needs?

7. Can you think of any **information or services** that the university and/or library may be able to provide students who may be vulnerable to dropping out that may help retain them?

8. Have you noticed that some student demographic groups have different information needs/retention issues compared to others? Please describe.

RQ4: To what extent is addressing the everyday life information needs of students a viable option for academic libraries?

9. What do you see as the information needs of undergraduate students?

10. Do you think the library can play a greater role in retaining students by helping to address both the **everyday life** and **academic needs** of students?
    - How do you envision this could play out?

11. If the library had easily accessible information to campus resources and other information to help students to address everyday life things (e.g., financial issues, career information, academic preparation skills, confidence, health/wellness, ways to connect with other students on campus, information about childcare for students with children…) do you think students would use it?
    - Why do you think so?

12. From a retention standpoint, how do you think this might impact student retention?

APPENDIX K

FRESHMAN INFORMATION SEEKING INTERVIEW PROTOCOL

RQ2: What are the social cognitive information needs of successful students?

1. Tell me a little bit about your educational background before you enrolled at this university. (Other college, high school)

2. How would you describe your previous success as a student? How about now?

3. How would you describe your confidence in your abilities to be academically successful here at this university?

4. During the course of an average week, what are some of most common types of information you find yourself looking for to answer questions in your everyday life? (Hours for a restaurant, movie times, health information, financial info, etc.).

5. During an average week as a college student, what are some of the most **common course related information needs** you encounter when completing a course assignment or research papers?

6. As a freshman, what have been some of the **major stressors** you've encountered during your first year of college? (challenges making friends, keeping up with coursework, financial stressors, support from home, loneliness, confidence)
    - Can you think of anything that might be helpful to freshman to make their first year successful?

7. Do you know of any students who have dropped out of the university or who are thinking of dropping out?
    - Why do you think this is?
    - Can you think of anything that might have helped them stay in school?

RQ3: How do undergraduate students prefer to meet their information needs?

8. In general, when you are looking to answer questions that arise during the course of your daily life, **how do you go about finding answers**?
    - How about for course related research?
    - Do you find that you take a different approach for everyday life and course related information seeking?

9. What are your most common "go to **sources**" for information for **everyday life** questions?
    - How about for course-related research?
    - Why do you tend to choose this/these resources over others?

10. What types of technology do you own? (smartphone, tablet, pc, laptop)

11. In a typical week, what **technology tools**, if any, do you typically use to find answers to questions that come up in your **everyday life**?
    - What **tools** do you typically use for your **course-related research**?
    - Why do you choose this/these types of technology over others?

Dependent Variable (Library Utilization)

12. Have you used the library since you've been a student here at the university?

13. How would you describe the frequency of your library use? (Never, 1-2 times/semester, 1-2 times/month, 1-2 times/week, almost daily, multiple times/day)

14. When you say you have used the library, tell me more about this.
    - In person or online?

    - What did you do when you were using the library? (study, look for books, use computers, access library databases or online catalog, group study, attend meetings or events)

15. Have you used the library's online resources such as the library website, online databases, online catalog, or research guides to complete homework assignments or to do research for a paper?
    - How about for non-course related research?

RQ1: What motivational variables best predict library utilization by undergraduate students?

16. When you have used the library in the past to find information for one of your course assignments, how would you describe your **success** in finding what you needed?

17. The next time you need to use the library's online resources such as databases or the library catalog, how **confident** are you that you will be able to find what you need?

18. When you have visited the library (in person or online), what has **prompted you to do so**?
    - What did you do on those occasions when you visited the library?

19. Did you feel that using the online library resources was **worthwhile** to you? Why is this?

20. Describe to me a bit about how you tend to **feel** when using the library's online resources. Why do you think you feel this way?

21. In general, how would you compare your experiences in looking up something for a course assignment using the library versus using Google? (time, effort, success, satisfaction)

22. A lot of undergraduate students tend to avoid using the library in favor of easier sources such as Google. Why do you think this is?

23. What are some things that might motivate students to use the library's online resources? Ask further probing questions as necessary.

RQ4: To what extent is addressing the everyday life information needs of students a viable option for academic libraries?

24. Libraries are interested in understanding more about the everyday information needs of students. What are your thoughts as far as what the library could be offering that could be relevant and useful to you?

25. If the library had easily accessible information to campus resources and other information to help students to address everyday life things (e.g., financial issues, career information, academic preparation skills, confidence, health/wellness, ways to connect with other students on campus, information about childcare for students with children, information security such as privacy or fraud…) do you think students would use it? Why do you think so?
    - How important do you think this type of information is for students on a daily basis (place to eat, checking for career)?

Ask interviewees to email me their mailing address for an Amazon gift card.

APPENDIX L

UNDERGRADUATE STUDENT ONLINE SURVEY

Demographic/Background Information

1. Are you currently classified as an undergraduate student?
    - Yes
    - No

2. University enrollment.
   Please select your university from the list below.
    - University 1
    - University 2
    - University 3

3. Are you a first generation college student?
   (Neither of your parents enrolled in post-secondary education such as a vocational school, community college, independent college (such as an institute of technology), or 4-year college or university.)
    - Yes – I am a first generation college student.
    - No – I am not a first generation college student.
    - Not sure

4. Were you enrolled in at least one course during the Fall 2015 semester at this university?

Library Usage and Experiences

The following set of questions relate to your experiences and perceptions about your university's **academic library.**
NOTE: An academic library is a library which serves an institution of higher learning, such as a college or university. These libraries traditionally serve two complementary purposes: to support the school's curriculum and to support the research of the university faculty and students.

5. While a student at this university, have you attended a library instruction class (either in the library or a librarian came to your class)? If so, how many classes have you attended?
    - Yes – I have attended 1 library instruction class
    - Yes – I have attended 2 or more library instruction classes
    - No – I have not attended a library instruction class.
    - Not sure

6. During the previous semester, how often did you visit your academic library building **in person**?

   Select the choice below that is most accurate.
   - 0 (I did not visit the library)
   - < 5 (Less than 5 times during the semester)
   - 1-3 times/month
   - 1-2 times/week
   - Daily
   - Not Applicable

7. During the previous semester, how often did you access the academic library's **online** resources (e.g., online research databases, library catalog, research guides)?

   Select the choice below that is most accurate.
   - 0 (I did not visit the library)
   - < 5 (Less than 5 times during the semester)
   - 1-3 times/month
   - 1-2 times/week
   - 3 or more times/week
   - Daily
   - Not Applicable

8. If you visited the library during the previous semester, what did you do when you were there?

   Check all that apply.
   - Used the library computers, printers, or other equipment
   - Searched for information using the library's online research databases
   - Searched for information using the library's online library catalog.
   - Accessed a library research guide online
   - Attended a library instruction class or workshop
   - Group study
   - Quiet study
   - Browsed for and/or checked out a book, book on tape/CD, DD, or other library materials
   - Consulted with a librarian about a research project
   - Attended a meeting or event
   - Socialized with a friend
   - Accessed a special collection or archives
   - Visited a library social media site such as a blog, Facebook, or Twitter

- Viewed an online tutorial (print or video) about a library resource or service.
- Other (Please list)

Expectations about using the Academic Library's Online Resources

9. Please rate your agreement with the following statements about your expectations when using your academic library's **ONLINE RESOURCES** (e.g., online research databases, library catalog, library research guides)

   (Scale 1-7: 1=Strongly Disagree/7=Strongly Agree)
   9.1. I expect to be successful the next time I use the academic library's online resources.
   9.2. I am good at using the library's online.
   9.3. The last time I used the academic library's online resources I was successful in finding what I needed.

Value of Using the Academic Library's Online Resources

Please rate your agreement to the following statements about the value you place in using your academic library's **ONLINE RESOURCES** (e.g., research databases, online catalog, research guides).

(Scale 1-7: 1=Strongly Disagree/7=Strongly Agree)

10. I find that using my academic library's **ONLINE RESOURCES** such as research databases or the library catalog...
    10.1. Enables me to complete my course related assignments and research papers more quickly.
    10.2. Improves my performance when completing course related assignments and research papers.
    10.3. Is important in order to get good grades.
    10.4. Is useful in completing my academic coursework.
    10.5. Is interesting.
    10.6. Is enjoyable.

Value of Using the Academic Library's Online Resources (Continued)

Please rate your agreement to the following statements about the value you place in using your academic library's **ONLINE RESOURCES** (e.g., research databases, online catalog, research guides).

(Scale 1-7: 1=Strongly Disagree/7=Strongly Agree)

11. I find that using my academic library's **ONLINE RESOURCES** such as research databases or the library catalog...
    11.7. Is useful for helping me to achieve my future career goals.
    11.8. Is useful for my everyday life outside of school
    11.9. Takes too much of my time.
    11.10. Takes too much work.

11.11. Takes too much time away from other activities that I value.
11.12. Is frustrating.
11.13. Is stressful.

12. Please feel free to provide additional comments regarding your perceptions about using the academic library's ONLINE RESOURCES.

Potential Library Services, Tools, and Features

13. Given your current information needs, please rate the **LIKELIHOOD** that you would **actually use** the following potential library services, tools, or features if they were offered by your university.

    (Scale 1-7, 1-Very Unlikely/7=Very Likely)

    - One search box for everything I need
    - Capability to search the library and Google (or other search engines) at the same time
    - 24/7 Online chat support.
    - Easy access to full text articles
    - Pre-selected library materials for my courses and/major
    - Customizable website so I can have easy access to all my favorite information sources.
    - Personal librarian to contact for questions
    - Capability to just type in what I'm looking for without worrying about special searching language or strategies
    - Mobile library website
    - Mobile library app for smart phones and tablets

Potential Library Services, Tools, and Features (Continued)

14. Given your current information needs, please rate the **LIKELIHOOD** that you would **actually use** the following potential library services, tools, or features if they were offered by your university.

    (Scale 1-7, 1-Very Unlikely/7=Very Likely)

    - Information about other services available on campus (e.g., counseling, financial aid, health center)
    - Tools to help me connect with others on campus (e.g., groups, individuals)
    - Tools to help me stay connected with people at home
    - Health and wellness information
    - Career/job information
    - Easy access to news and current event information
    - Information to help me overcome my financial issues.
    - Information to help me develop the academic skills to be successful in college.

15. Is there anything else you can think of that would increase the **LIKELIHOOD** of using your academic library's online resources?

Information Seeking Preferences (Everyday Life)
Please respond to the questions below regarding the types of resources you prefer to use when looking up information to answer questions that arise during your **everyday life** (e.g., business hours or location, health information, movie listing, financial information, current events).

16. How often do you consult the following resources when looking up information to answer questions that arise during your **everyday life?**

    (Scale 1-7: 1=Never/7=Almost Always)
    - Academic Library Databases
    - Blogs
    - Classmates
    - Email
    - Friends/Family
    - Google or other Search Engine
    - Google Scholar
    - Government Websites
    - Instructors/Professors
    - Librarians
    - Library Books
    - Magazines
    - Mobile Apps
    - Newspapers
    - Personal Collection
    - Radio
    - Smart Phone Browser
    - Television
    - Virtual Agent (e.g., Siri, Cortana)
    - Wikipedia
    - Text Messaging
    - University Website
    - Websites (Non-University)
    - Other

17. Please free to provide additional comments regarding your preferences for information resources you use when looking up information to answer questions that arise during your **everyday life.**

Information Seeking Preferences (Academic)
Please respond to the questions below regarding the types of resources you prefer to use for your **course-related assignments and research papers.**

18. How often do you consult the following resources for your **course-related assignments and research** papers?

    (Scale 1-7: 1=Never/7=Almost Always)
    - Academic Library Databases
    - Blogs
    - Classmates
    - Course Readings
    - Email
    - Friends/Family
    - Google or other Search Engine
    - Google Scholar
    - Government Websites
    - Instructors/Professors
    - Librarians
    - Library Books
    - Magazines
    - Mobile Apps
    - Newspapers
    - Online Study Tools & Resources (e.g., Dictionary, Quizlet, SparkNotes)
    - Personal Collection
    - Radio
    - Smart Phone Browser
    - Television
    - Virtual Agent (e.g., Siri, Cortana)
    - Wikipedia
    - Text Messaging
    - University Website
    - Websites (Non-University)
    - Other

19. Please free to provide additional comments regarding your preferences for information resources you use for your **course-related assignments and research papers.**

Academic and Career Goals and Expectations

20. Please rate your agreement to the following questions about your **academic and career goals and expectations.**

    (Scale: 1-7: 1=Strongly Disagree/7=Strongly Agree)
    20.1. It is important for me to get a college degree from this university as opposed to some other university.
    20.2. My education at this university will be useful for getting future employment.
    20.3. My education at this university will be useful for getting work that I really like.
    20.4. My education at this university will be useful for getting a well-paying job.
    20.5. I am confident that I have selected the right academic major for myself.
    20.6. Completing my academic major will help me achieve my future career goals after graduation.

21. Pleases feel free to provide additional comments regarding your **academic goals and expectations**, particularly as they apply to this university.

Academic Confidence
The following set of questions relate to your academic confidence.

22. Please rate your agreement to the following statements.

    (Scale: 1-7: 1=Strongly Disagree/7=Strongly Agree)
    I am confident that I will…
    22.1. Graduate from this university.
    22.2. Complete the requirements for my academic major with a GPA of 3.0 or above.
    22.3. Earn a cumulative GPA of at least 2.0 after two years of study.
    22.4. Earn a cumulative GPA of at least 2.0 after three years of study.
    22.5. Excel at my university over the next two semesters.

23. Please feel free to provide additional comments regarding your **academic confidence**.

Student Support Services
The following questions relate to services that are available on campus to support students.

24. Please indicate if you are **aware** of the following services that are available to you as a student at this university. *(Check all that apply.)*
    24.1. Academic Advising

24.2. Accessibility Resources (e.g., alternative or adaptive technology, academic & organization assistance, advocacy, interpreter)
24.3. Campus Involvement Opportunities (e.g., information about clubs and organizations)
24.4. Career Counseling
24.5. Counseling Center (Mental Health)
24.6. Financial Aid Counseling
24.7. Health & Wellness Center
24.8. Speaking Center
24.9. Student Employment
24.10. Support for English as a Second Language (ESL) Learners
24.11. Technology/IT Support
24.12. Tutoring Services
24.13. Writing Center

25. Please rate the **LIKELIHOOD** that you will **access** the following services (in person or online) while a student at this university.

(Scale 1-7: 1=Very Unlikely/7=Very Likely)
25.1. Academic Advising
25.2. Accessibility Resources (e.g., alternative or adaptive technology, academic & organization assistance, advocacy, interpreter)
25.3. Campus Involvement Opportunities (e.g., information about clubs and organizations)
25.4. Career Counseling
25.5. Counseling Center (Mental Health)
25.6. Financial Aid Counseling
25.7. Health & Wellness Center
25.8. Speaking Center
25.9. Student Employment
25.10. Support for English as a Second Language (ESL) Learners
25.11. Technology/IT Support
25.12. Tutoring Services
25.13. Writing Center
25.14. Other

26. Please feel free to provide additional comments regarding **student support services** available to you as a student at this university.

Potential Barriers to Achieving Your Academic Goals
Please rate the **LIKELIHOOD** that you will encounter the following challenges while enrolled as a student at your current university.

(*Scale 1-7: 1=Not Likely/7=Extremely Likely)*
27. While enrolled as a student as this university, I will encounter:
    27.1. Money problems
    27.2. Family problems
    27.3. Not being smart enough
    27.4. Negative family attitudes about college
    27.5. Not fitting in at college
    27.6. Lack of support from professors
    27.7. Not being prepared enough
    27.8. Not knowing how to study well
    27.10. Loneliness
    27.11. Mental health issues such as depression or anxiety
    27.12. Lack of support from university staff (e.g., advisors, financial aid counselors)
    27.13. Academic probation, suspension, or dismissal

Potential Barriers to Achieving Your Academic Goals (Continued)
Please rate the **LIKELIHOOD** that you will encounter the following challenges while enrolled as a student at your current university.

(*Scale 1-7: 1=Not Likely/7=Extremely Likely)*
28. While enrolled as a student as this university, I will encounter:
    28.11. Lack of support from friends to pursue my educational aspirations
    28.12. Negative attitudes about gender
    28.13. Negative attitudes about my race or ethnicity
    28.14. Relationship concerns
    28.15. Having to work while I go to school
    28.16. Lack of role models or mentors
    28.17. Lack of financial support
    28.19. Difficulty findings student employment
    28.20. Difficulty managing my time
    28.30. Lack of motivation
    28.31. Uncertainty about choice of major
    28.18. Other

29. Please feel free to provide additional comments regarding your **potential barriers or challenges** you expect to encounter as you pursue your academic goals.

Technology Preferences

Please respond to the questions below about the types of technology devices you own and prefer to use for information seeking.

30. What types of technology devices do you own? (Check all that apply.)
    - Smartphone
    - Cell phone that is not a smartphone
    - Laptop computer
    - Desktop computer
    - Tablet (e.g., iPad)
    - Other (please list)

31. During a typical week, how often do you use the following types of technology tools to access the Internet to answer questions that arise during the course of your **everyday life**?

    (Scale 1-7: 1=Never/7=Almost Always)
    - Laptop computer
    - Smart Phone
    - Tablet (iPad, etc.)
    - Desktop computer at library
    - Desktop computer in residence
    - Desktop computer at work
    - Other

32. During a typical week during the school year, how often do you use the following types of technology tools to access the Internet to complete your **course related assignments and research papers**?

    (Scale 1-7: 1=Never/7=Almost Always)
    - Laptop computer
    - Smart Phone
    - Tablet (iPad, etc.)
    - Desktop computer at library
    - Desktop computer in personal residence
    - Desktop computer at work
    - Other

33. Please feel free to provide additional comments regarding the **technical devices** you use for your **everyday life and course-related research.**

Demographic/Background Information

34. Gender
    - Male
    - Female
    - Other

35. How old were you on your last birthday?
    - 18-24 years
    - 25-64 years
    - 65+ years old
    - Prefer not to say

36. Which option below best describes your race?
    - American Indian /Alaskan Native
    - Asian/Native Hawaiian/Pacific Islander
    - Black/African American
    - White (Caucasian)
    - White (Spanish, Hispanic, Latino)
    - Two or more races
    - Other _____

37. Which item below best describes your enrollment status during the Spring 2016 semester?
    - Full time student – primarily on-campus
    - Full time student – primarily online
    - Part time student – primarily on-campus
    - Part-time student – primarily online
    - Other (please note) _____

38. Which category best describes your academic major?
    - Arts & Humanities (e.g., English, History, Philosophy, Art)
    - Social Sciences (e.g., Communication, Education, Psychology)
    - Math, Science, and Technology (e.g., Chemistry, Engineering, Computer Science)
    - Business (e.g., Accounting, Finance, Business Management, Human Resources)
    - Health and Human Services (Nursing, Kinesiology)
    - Double Major (cross discipline – two or more categories)
    - Undeclared/Undecided

39. What is your overall (cumulative) GPA as of last semester, according to the campus Registrar?
    - 3.6-4.0
    - 3.1-3.5
    - 2.6-3.0
    - 2.1-2.5
    - 2.0 or below
    - Prefer not to say

40. What is your family's annual household income?
    - Less than $20,000/year
    - $20,000 - $34,999/year
    - $35,000 - $49,999/year
    - $50,000 - $74,999/year
    - $75,000 - $99,999/year
    - Not sure

41. What is the highest level of education completed by either of your parents?
    - Some high school, no diploma
    - High school graduate, diploma or equivalent (for example: GED)
    - Some college credit, no degree
    - Trade/technical/vocational training
    - Associate degree
    - Bachelor's degree
    - Master's degree
    - Doctoral degree (e.g., MD, PhD, EdD)
    - Other (Please note): _____

42. Do you speak a language other than English in your home?
    - Yes (please list) _____
    - No

43. Are you classified as an International Student at this university?
    - Yes
    - No

Survey Follow-Up

44. Would you be willing to participate in a follow-up interview with the researcher?
    - Participation will involve approximately 30 minutes of your time via phone in which the researcher will ask you some follow-up questions about your survey responses.

- Individuals who are selected and participate in an interview will receive a **$10 Amazon gift card** as a token of appreciation.
- Indication of interest does not commit you to participate in this study.
- If you would like to be considered for an interview, please provide your name and email below and indicate your interest by selecting "yes".

- Yes – I am willing to participate in a follow-up interview.
- No – I do not wish to participate in a follow-up interview.

45. Would you like your name to be entered into the drawing for a $50 Amazon gift card?
    NOTE: Names and email address will not be shared with other parties and will only be used by the researcher to contact you if you are selected to participate in an interview or if you wish a $50 Amazon gift card.

46. Your Name: _____

47. Your Email Address: _____

APPENDIX M

UNDERGRADUATE SURVEY EMAIL INVITATION AND REMINDER MESSAGES

Original Survey Email Invitation

Greetings!

I am pleased to invite you to complete this online survey about your information seeking needs, preferences, and motivation as an undergraduate student. You have been randomly selected to participate in this research study. If you elect to complete this online survey, you will have the opportunity to enter your name into a drawing to win a **$50 Amazon Gift Card**!

This study is part of a dissertation study that is being conducted as part of my PhD doctoral studies program in the University of North Carolina at Greensboro (UNCG) Teacher Education & Development/Library & Information Studies departments. The information you provide to this study will be a valuable contribution to higher education institutions as they work to better meet the needs of their undergraduate students.

All data collected in this study will be kept confidential. No unique identifiers will be collected. I anticipate that the survey will take you approximately 15 - 20 minutes to complete. Your participation is completely voluntary and if you elect to participate, you may withdraw at any time. Choosing not to participate or withdrawing from the study will have no impact on your course grades.

This study has been approved by (Name of University 1) Institutional Review Board, (Name of University 2) Institutional Review Board and Student Affairs Research Committee, and the (Name of University 3) Office of Research and Creative Scholarship. If you wish to participate in this study, please follow the link below to review the informed consent document and complete the survey.

Please take the online survey here.

Should you have any questions or wish for your name to be removed from the distribution list, please feel free to contact me via email at racroxto@uncg.edu.

I sincerely hope that you will elect to participate in this study! Thank you for your consideration.

NOTES: You must be 18 or older to participate in this study.

Sincerely,
Rebecca Croxton, MLIS
UNCG School of Education
TEHE/LIS Doctoral Candidate

Reminder Email Message #1 (send one week after initial invitation)
Greetings!

Last week you received an email message inviting you to participate in a survey research study about the information needs, preferences, and motivation of undergraduate students. If you have already completed this survey, thank you!

If you have not had a chance to take the survey yet, I would appreciate your reading the message below and completing the survey. The survey should take approximately 15-20 minutes to complete. If you elect to complete this online survey, you will have the opportunity to enter your name into a drawing to win a **$50 Amazon Gift Card**.

This message has gone out to everyone in the selected sample population. Since personal data is not retained with the survey responses for reasons of confidentiality, I am unable to identify whether or not you have already completed the survey.

To take the web-based survey, click on this survey link or copy and paste this link into your Web browser: https://uncg.qualtrics.com/jfe/form/SV_6FlrvrxV9OPuMVn

Should you have any questions, please feel free to contact me via email at racroxto@uncg.edu.
I sincerely hope that you will elect to participate in this study! Thank you for your consideration.

Sincerely,
Rebecca Croxton, MLIS

Reminder Email Message #2 (send two weeks after initial invitation)
Greetings!

Two weeks ago, you received an email message inviting you to participate in a survey research study about the information needs, preferences, and motivation of undergraduate students. If you have already completed this survey, thank you!

If you have not had a chance to take the survey yet, I would appreciate your reading the message below and completing the survey. The survey should take approximately 15 - 20 minutes to complete. If you elect to complete this online survey, you will have the opportunity to enter your name into a drawing to win a **$50 Amazon Gift Card**. The last day to complete the survey is Saturday at 11:59 PM.

To take the web-based survey, click on this survey link or copy and paste this link into your Web browser: https://uncg.qualtrics.com/jfe/form/SV_6FlrvrxV9OPuMVn

Should you have any questions, please feel free to contact me via email at racroxto@uncg.edu.
I sincerely hope that you will elect to participate in this study! Thank you for your consideration.

Sincerely,
Rebecca Croxton, MLIS

APPENDIX N

RESEARCH QUESTIONS, INITIAL CONSTRUCTS, SOURCES, & RELIABILITY

Research Questions, Initial Constructs, Items, Sources, and Reliability

Research Question	Construct	Item# in Current Survey	Original Source/Source Instrument	# Items in Source	Source Rel.(α)
N/A	Demographic	1 – 4 & 34 - 43	N/A – Items developed by the researcher	--	--
N/A	Dep. Var. – Library Use	5 – 8	N/A - Questions developed by the researcher	--	--
RQ1	Motivation – Expectancies for Success	9.1 9.2 9.3	Expectancy-Value Theory of Motivation – Ability/Expectancy Subscale (Modified) (Wigfield & Eccles, 1995)	5	0.92
RQ1	Motivation – Attainment Value	10.1 10.2 10.3 10.4	Expectancy-Value Theory of Motivation – Attainment Value Subscale (Modified) (Wigfield & Eccles, 1995)	3	0.70
RQ1	Motivation – Intrinsic Value	10.5 10.6	Expectancy-Value Theory of Motivation – Intrinsic Value Subscale (Wigfield & Eccles, 1995)	2	0.76
RQ1	Motivation – Utility Value	11.7 11.8	Expectancy-Value Theory of Motivation – Utility Value Subscale (Wigfield & Eccles, 1995)	2	0.62
RQ1	Motivation – Cost Belief	11.9 – 11.13	Cost Scale (Flake et al., 2015)	19	0.97
RQ1	Motivation – Open Ended	12	N/A - Question developed by researcher	--	--
RQ4	Motivational Factors for Using Academic Library	13.1-13.10 & 14.11-14.20	N/A – 18 item list developed by the researcher from literature and pre-survey interviews	--	--

Research Question	Construct	Item# in Current Survey	Original Source/Source Instrument	# Items in Source	Source Rel.(α)
RQ4	Motivational Factors – Open Ended	15	N/A - Question developed by the researcher	--	--
RQ3	Resources Preferences – ELIS	16 (23 item list)	List adapted from IMILS survey (Singh et al., 2012)	13	--
RQ3	Resource Preferences – ELIS – Open Ended	17	N/A - Questions developed by the researcher	--	--
RQ3	Resources Preferences – Academic	18 (26 item list)	List adapted from IMILS survey (Singh et al., 2012)	13	--
RQ3	Resource Preferences – Academic – Open Ended	19	N/A - Questions developed by the researcher	--	--
RQ2	Performance Goals	20.1	(Cabrera et al., 1992) (Kahn & Nauta, 2001)	1 1	n/a
RQ2	Outcome Expectations	20.2 – 20.6	Outcomes Expectations Subscale (Bean, 1985) (Kahn & Nauta, 2001)	 9 3	 0.81 0.84
RQ2	Performance Goals & Expectations – Open Ended	21	N/A - Question developed by the researcher	--	--
RQ2	Academic Self-Efficacy	22.1 – 22.5	Modified version of the Self-Efficacy for Broad Acad. Milestones Scale Lent, Brown, & Gore, 1997 Kahn & Nauta, 2001	 12 12	 0.88 0.92
RQ2	Academic Self-Efficacy – Open Ended	23	N/A - Question developed by the researcher	--	--

Research Question	Construct	Item# in Current Survey	Original Source/Source Instrument	# Items in Source	Source Rel.(α)
RQ2	Student Support Services – Awareness	24.1 – 24.13 and 25.1 – 25.14	N/A – Question developed by the researcher	--	--
RQ2	Student Support Services – Awareness – Open Ended	26	N/A – Question developed by the researcher	--	--
RQ2	Educational Barriers	27 (12 items) 28 (l2 items)	Perception of Educational Barriers Scale (Modified) Luzzo & McWhirter, 2001	21	0.93
RQ2	Educational Barriers – Open Ended	29	N/A – Question developed by the researcher	--	--
RQ3	Tech Devices Owned	30.1 – 30.6	N/A - List developed by the researcher	--	--
RQ3	ELIS Tech Devices	31.1 – 31.7	N/A – List developed by the researcher	--	--
RQ3	Acad Tech Devices	32.1 – 32.7	N/A – List developed by the researcher	--	--
RQ3	Tech Devices – Open Ended	33	N/A – List developed by the researcher	--	--
N/A	Demographic	34 – 43	N/A – Items developed by the researcher	--	--
N/A	Volunteer Interest	44	N/A	--	--
N/A	Gift Card	45	N/A	--	--
N/A	Name	46	N/A	--	--
N/A	Email	47	N/A	--	--

APPENDIX O

EXPECTANCY-VALUE LIBRARY MOTIVATION SCALE AND SUBSCALE RELIABILITY AND NORMALITY

Scale reliability

A reliability analysis was conducted on the full scale for measures relating to the Expectancy-Value Library Motivation as well as on each of the three subscales: Expectancies for Success, Subjective Task Value, and Cost Beliefs. The items for Cost Beliefs were reverse coded for this analysis so that scores would align with values relating to the other dimensions, thus high values for Cost Beliefs indicate favorable perceptions of cost (high scores = low cost). Across the **full scale**, reliability was found to be excellent as measured by Cronbach's alpha (α=.921). This value meets and/or exceeds Cronbach's alpha scores found in the original source instruments (Appendix N) relating to the Expectancy-Value Theory of Motivation (Eccles & Wigfield, 1995). This favorable comparison between the use of the modified scale in the current study with that of Eccles and Wigfield (1995) helps to establish consistent internal reliability of this instrument.

The summary of item means (Mean=4.792) for the full scale suggests items cluster very slightly towards the upper end of the scale (desired mean for a 7-point scale = 4.0). The average standard deviation across the full scale (SD=1.59) falls above the minimum standard deviation threshold for a 7-point scale (SD=1.5), suggesting there is adequate variability of scores about the mean. The mean of Inter-Item Correlations (r=.308) suggests that correlation between some items within the scale may not be strong. This is not unexpected, as the subscales within this full scale are intended to

measure different underlying constructs and items within one subscale are not necessarily intended to strongly correlate with items in the other subscales.

To assess whether the items identified to comprise the three subscales of the Expectancy-Value Library Motivation Scale: (1) Expectancies for Success, (2) Library Value, and (3) Cost Beliefs formed reliable constructs, Cronbach's alpha, corrected item total correlations, Cronbach's alpha if deleted, and mean of inter-item correlations were reviewed (see Appendix O – Table 1). Overall, the data suggest the three subscales have very good to excellent reliability, with all Cronbach's Alpha scores greater than α =.85. Corrected item total correlations for all items in each subscale fall above the minimum desired threshold ($r \geq .40$), suggesting the items forming each subscale "hang together" adequately. Cronbach's alpha if deleted scores for all items in each subscale fell below the identified Cronbach's alpha, with the exception of a single item (#11.8) in the Library Value subscale, which had a Cronbach's alpha if deleted score of 0.921 compared to the subscale Cronbach's alpha of 0.920. This was not a cause for concern, since the reliability was strong overall, and the item was thought to be of value to the study. The means of Inter-Item correlations for each of the three subscales exceeded the minimum threshold ($r \geq .40$), with the lowest Subscale inter-item correlation ($r = .594$) for the Library Value subscale.

Appendix O - Table 1

Expectancy – Value Library Motivation Scale: Reliability of Factor Sub-Scales and Items Summary Table

Factor/Item	Cronbach's Alpha α	Corrected Item Total Correlations (desired $r \geq .40$)	Cronbach's Alpha if deleted (desired < α)	Mean of Inter-Item Correlations (r)
Full Scale (All items)	0.873	--	--	0.308
Expect. for Success	0.862	--	--	0.845
9.1	--	0.725	0.819	--
9.2	--	0.746	0.800	--
9.3	--	0.747	0.798	--
Library Value Scale	0.920	--	--	0.594
10.1	--	0.739	0.909	--
10.2	--	0.792	0.905	--
10.3	--	0.745	0.908	--
10.4	--	0.780	0.905	--
10.5	--	0.755	0.907	--
10.6	--	0.726	0.910	--
11.7	--	0.743	0.908	--
11.8	--	0.601	0.921*	--
Cost Value Subscale	0.921	--	--	0.700
11.9	--	0.783	0.905	--
11.10	--	0.851	0.892	--
11.11	--	0.788	0.904	--
11.12	--	0.801	0.902	--
11.13	--	0.753	0.911	--

*Value falls outside of desired threshold.

Review of Item Means and Standard Deviations

While the overall **mean of item means** (M=4.86) and **mean standard deviation** (SD = 1.59) for the full scale and within each subscale suggest values fall only slightly above the center of the scale and have adequate variability about the mean, analyses were conducted at the item level to assess if any items require further review. As illustrated in Appendix O – Table 2, the majority of item means fell slightly above the desired threshold (M = 4.0 ± .5), suggesting responses may a slight negative skew. The standard

deviations across all items were above the minimum desired threshold (>1.5), suggesting adequate variability about the mean with the exception of the three items in the Expectancies for Success subscale and item #10.1 in the Library Value subscale, which fell slightly below the desired range.

Appendix O – Table 2

Expectancy Value Library Motivation – Subscale Item Means and Standard Deviations

Scale/Item	Mean (desired M=4.0)	Standard Deviation (desired SD > 1.5)
Full Scale	4.86*	1.594
Expectancies for Success	5.52*	1.432*
9.1	5.73*	1.359*
9.2	5.17*	1.499*
9.3	5.65*	1.435*
Library Value Scale	4.75*	1.642
10.1	5.24*	1.314*
10.2	5.23*	1.502
10.3	4.72*	1.785
10.4	5.26*	1.636
10.5	4.59	1.682
10.6	4.22*	1.696
11.7	4.68*	1.720
11.8	3.73	1.823
Cost Value Subscale (REV)	4.59*	1.649
11.9	4.36	1.653
11.10	4.53*	1.614
11.11	4.66*	1.603
11.12	4.58*	1.698
11.13	4.80*	1.672

*Value falls outside of desired threshold.

Review of Subscale Normality

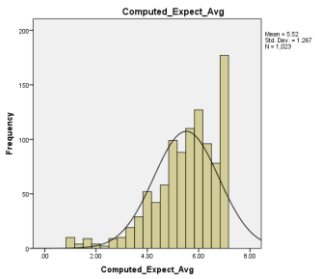
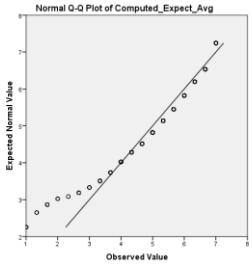
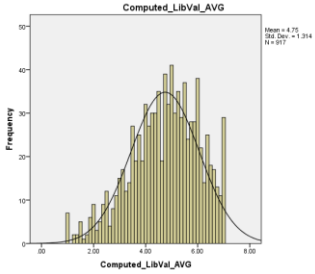
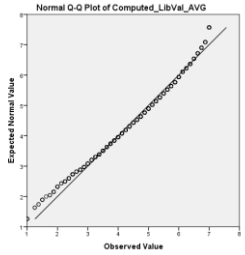
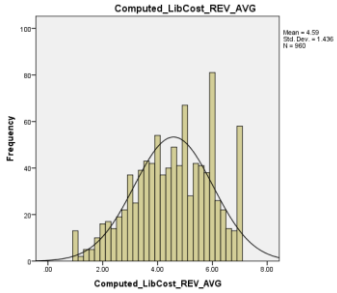
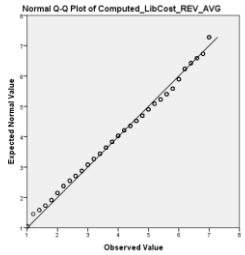
The three sub-scales of the Expectancy-Value Library Motivation scale were further assessed for normality by averaging the item scores within each subscale and reviewing the skew, kurtosis, and percentile rankings (see Appendix O – Table 3). In addition, histograms and Q-Q plots were created to aid with visual interpretation of the data. Analyses revealed the Expectancies for Success subscale is slightly negatively skewed, suggesting values fall towards the upper end of the scale. Library Value and Cost Beliefs subscales were found to have only negligible skew, with the values falling within the range of desirability ($< \pm 1.0$). Distributions for all three subscales had minimal levels of kurtosis with values for each subscale falling in the desired range ($< \pm 3.0$). Further review of percentile rankings revealed that average subscale scores for both Expectancies for Success and Library Value slightly exceeded the desired range (4.0 ± 0.5 on a 7 point scale), while the Cost Beliefs subscale scores fell within the desired range. Mean scores for Library Value and Cost Beliefs at the 75^{th} percentile were at or only slightly above the expected range 5.25 ± 0.5, while Expectancies for Success mean values were more noticeably clustered towards the higher end of the scale. Visual review of the histograms and Q-Q plots further suggests a slight deviation from normality for the Expectancies for Success subscale, while distributions approach near normality for the Value and Cost subscales. These findings are, overall, not expected, nor do they elicit great cause for concern.

Appendix O – Table 3

Expectancy-Value Library Motivation - Statistical Review of Sub-Scale Normality

Scale	Skew (Desired < ± 1.0)	Kurtosis (Desired < ± 3.0)	50th Percentile (expected M=4.0)	75th Percentile (expected M=5.25)
Expect. for Success	-1.086*	1.334	5.67*	6.33*
Value	-0.437	-.222	4.87*	5.75*
Cost	-0.276	-.569	4.60*	5.80*

*Value falls outside of desired or expected range.

	Histogram	Q-Q Plot
Expectancies for Success		
Value		
Cost		

Conclusions of Reliability Analysis of Expectancy-Value Library Motivation Scale and Subscales

Overall, the findings of this reliability analysis suggest the three subscales comprising the Expectancy-Value Library Motivation Scale: (1) Expectancies for Success, (2) Value, and (3) Cost have strong reliability based upon statistical findings for Cronbach's alpha scores, Cronbach's alpha if deleted scores, and corrected item-total correlations. Further review of descriptive statistics, including scale and item means, standard deviations and measures of central tendency including skew, kurtosis, and percentile rankings suggest data are largely distributed as expected across the scale, with a slight negative skew for data on the Expectancies for Success subscale. Percentile rankings further suggest a slightly greater than average cluster of scores at the higher end of the scale for Expectancies for Success. Interpretation of these findings suggest that participants largely expect to succeed when using online library resources.

The strong reliability of these subscales further affirms the decision to analyze the data according to three factors – Expectancies for Success, Library Value, and Cost Beliefs. In the initial research plan, it was expected that questions designed to measure attainment value (#10.1 – 10.4), intrinsic value (#10.5-10.6), and utility value (#11.7 – 11.8) (anticipated subconstructs of Library Value) would comprise their own factors. However, due to the minimal number of items in two of the three proposed constructs for Library Value, they were combined to measure Library Value as a single construct and were found to have higher reliability when measured together (α = .92) in the present study than when measured separately as noted for the original source instruments (Attainment Value, α = .70; Intrinsic Value, α =.76; and Utility Value α =.62).

APPENDIX P

SOCIAL COGNITIVE CAREER SCALE AND SUBSCALE RELIABILITY AND REVIEW OF NORMALITY

Scale Reliability

A reliability analysis was conducted on the full scale for measures related to the Social Cognitive Career Theory as well as on each of the three subscale (Performance Goals, Outcome Expectations, and Academic Self-Efficacy). Across the **full scale**, reliability was found to be very good as measured by Cronbach's alpha (α = .870). The summary of item means (Mean=6.149) suggests items cluster towards the upper end of the scale (desired mean for a 7-point scale = 4.0). Further, the average standard deviation across the full scale (SD=1.286) falls below the minimum standard deviation threshold for a 7-point scale (SD=1.5), suggesting there is less than optimal variability of scores about the mean.

The mean of inter-item correlations (Mean = 0.395) suggests that correlation between some items within the scale, though positive, may not be strong. This is not unexpected, as the subscales within this full scale are intended to measure different underlying constructs and items within one subscale are not necessarily intended to strongly correlate with items in the other subscales. To assess whether the items identified to comprise the primary subconstructs of the Social Cognitive Career Scale (1) Performance Goals, (2) Outcome Expectations, and (3) Academic Self-Efficacy formed reliable subscales, Cronbach's alpha, corrected item total correlations, Cronbach's alpha if deleted, and mean of inter-item correlations were reviewed (see Appendix P – Table 1).

Reliability of Performance Goals was not assessed, as this construct is measured by a single item. The items comprising the two other subscales, Outcome Expectations and Academic Self-Efficacy, were found to have very good reliability, with Cronbach's alpha scores for both scales greater than $\alpha = .87$, which fell very near the Cronbach's alpha scores for the original source instrument scales (see Appendix N). Corrected item total correlations for all items in each subscale fell above the minimum desired threshold ($r \geq .40$), suggesting the items forming each subscale "hang together" adequately. Cronbach's alpha if deleted scores for all items in each subscale fell below the identified Cronbach's alpha, with the exception of a single item (#20.5) in the Outcome Expectations subscale, which had a Cronbach's alpha if deleted score of 0.885 compared to the subscale Cronbach's alpha of 0.874. This was not a cause for concern, since the reliability was strong overall, and the item was thought to be of value to the study. The means of inter-item correlations for the Outcome Expectations and Academic Self-Efficacy subscales exceeded the minimum threshold ($r \geq .40$), with the lowest subscale inter-item correlation ($r = .595$) for the Outcome Expectations subscale.

Appendix P - Table 1

Social Cognitive Career Scale: Reliability of Factor Sub-Scales and Items Summary Table

Factor/Item	Cronbach's Alpha (α)	Corrected Item Total Correlations (desired $r \geq .40$)	Cronbach's Alpha if deleted (desired < α)	Mean of Inter-Item Correlations (r)
Full Scale-All Items	0.870	--	--	0.395
Performance Goals	N/A	--	--	N/A
20.1	--	--	--	
Outcome Expect.	0.874	--	--	0.595
20.2	--	0.763	0.836	--
20.3	--	0.802	0.823	--
20.4	--	0.672	0.855	--
20.5	--	0.572	0.885*	--
20.6	--	0.746	0.837	--
Acad. Self-Efficacy	0.871	--	--	0.700
22.1	--	0.634	0.859	--
22.2	--	0.784	0.822	--
22.3	--	0.631	0.862	--
22.4	--	0.787	0.820	--
22.5	--	0.681	0.848	--

*Value falls outside of desired threshold.

Review of Item Means and Standard Deviations

While the overall **mean of item means** (M=6.149) and **mean standard deviation** (SD= 1.286) for the full scale and within each subscale suggest values fall noticeably above the center of the scale and have little variability, analyses were conducted at the item level to assess if any items require further review. As illustrated in Appendix P – Table 2, the majority of item means fell noticeably above the desired threshold (M = 4.0 ± 0.5), suggesting responses are negatively skewed. The standard deviations across all items, with the exception of items #20.1 and 20.5, fell below the minimum desired threshold (>1.5), suggesting inadequate variability about the mean.

Appendix P – Table 2

Social Cognitive Career Scale – Subscale Item Means and Standard Deviations

Scale/Item	Mean (desired M=4.0)	Standard Deviation (desired SD > 1.5)
Full Scale	6.15*	1.286*
Performance Goals	--	--
20.1	5.50*	1.648
Outcome Expectations	6.02*	1.335*
20.2	6.25*	1.174*
20.3	6.06*	1.302*
20.4	5.91*	1.377*
20.5	5.72*	1.536
20.6	6.16*	1.277*
Academic Self-Efficacy	6.40*	1.165*
22.1	6.57*	1.065*
22.2	6.22*	1.335*
22.3	6.69*	0.890*
22.4	6.32*	1.247*
22.5	6.17*	1.236*

*Value falls outside of desired threshold.

Review of Subscale Normality

The three sub-scales of the Social Cognitive Career scale were further assessed for normality by averaging the item scores within each subscale (except Performance Goals which was measured by a single item) and reviewing the skew, kurtosis, and percentile rankings (see Appendix P – Table 3). In addition, histograms and Q-Q plots were created to aid with visual interpretation of the data. Analysis revealed the all subconstructs were negatively skewed, suggesting values fall towards the upper end of the scales. Further, while the Performance Goals and Outcome Expectations had an acceptable level of kurtosis, the Academic Self-Efficacy scale fell well beyond the acceptable range (7.49 compared to desired kurtosis range $< \pm 3.0$), which suggests an

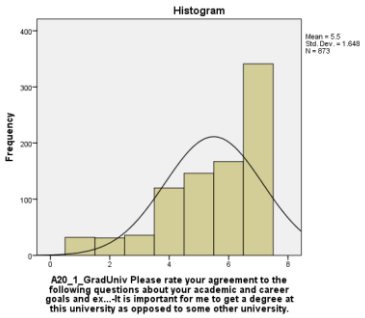
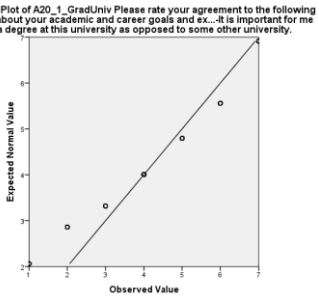
unexpectedly high spike of scores at the upper end of the scale. Further review of percentile rankings revealed that scores fell much above the expected range of a normal distribution. Visual review of the histograms and Q-Q plots further affirms a noticeable deviation from normality for all subconstructs of the Social Cognitive Career scale. These findings are not unexpected, nor do they elicit great cause for concern, as they merely suggest that undergraduate students have, for the most part, high performance goals, high outcome expectations for themselves, and a great deal of confidence that they will be academically successful.

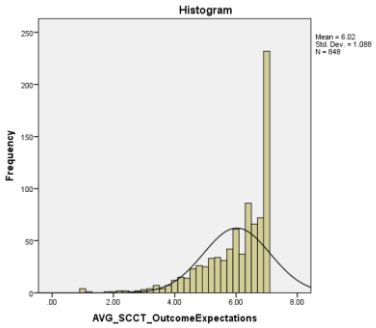
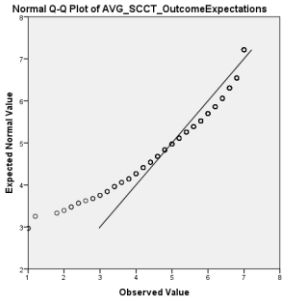
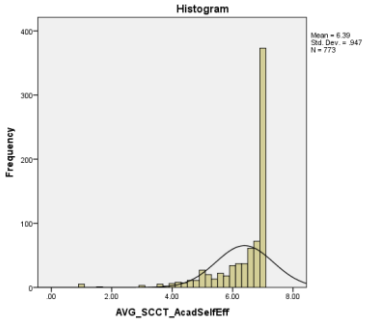
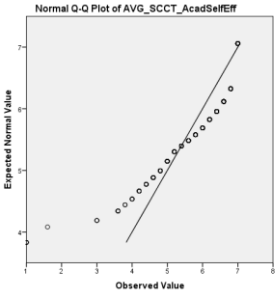
Appendix P – Table 3

Social Cognitive Career Scale - Statistical Review of Sub-Scale Normality

Scale	Skew (Desired < ±1.0)	Kurtosis (Desired < ±3.0)	50th Percentile (expected M=4.0)	75th Percentile (expected M=5.25)
Performance Goals	-1.041*	0.359	6.00*	7.00*
Outcome Expectations	-1.528*	2.808	6.40*	7.00*
Acad. Self-Efficacy	-2.353*	7.487*	6.80*	7.00*

*Value falls outside of desired threshold.

	Histogram	Q-Q Plot
Performance Goals		

Outcome Expectations		
Academic Self-Efficacy		

Conclusions of Reliability Analysis of Social Cognitive Career Scale and Subscales

Overall, the findings of this reliability analysis suggest the two subscales (Outcome Expectations and Academic Self-Efficacy) plus the item measuring Performance Goals have strong reliability based upon statistical findings for Cronbach's alpha scores, Cronbach's alpha if deleted scores, and corrected item-total correlations. Further review of descriptive statistics, including scale and item means, standard deviations and measures of central tendency including skew, kurtosis, and percentile rankings suggest the distributions for all three subconstructs reflect a deviation from normality with each factor's distribution having a noteworthy negative skew, suggesting

scores cluster at the high end of the scale and have very little deviation about the factor means. Rankings at both the 50th and 75th percentile further denote a greater than average cluster of scores at the higher end of the scale for each of the three subconstructs. Interpretation of these findings suggest that participants are committed to graduating from their universities, expect that their degrees will lead to future success, and are confident that they will be academically successful while attending their universities.

APPENDIX Q

EDUCATIONAL BARRIERS SCALE PRINCIPAL COMPONENTS ANALYSIS, SCALE RELIABILITY, AND REVIEW OF NORMALITY

Educational Barriers Scale – Review of Reliability and Normality

Scale Reliability – Full Scale

In addition to factors relating to social cognitive and career goals and self-efficacy, educational barriers were considered to be potentially important factors in understanding undergraduate students' information seeking needs, preferences, behaviors, and motivation to utilize library resources (Kahn & Nauta, 2001; Lent et al., 1994; Lent et al., 2000). To identify potential barriers that undergraduate students perceive they will encounter during their time at their universities, Luzzo and McWhirter's 21-item Perception of Educational Barriers Scale (α = .93) was modified to include 24 items included in the present study. Reliability analysis was conducted on the full Educational Barriers scale as well as on four subscales that were identified through Principal Components Analysis. All items were reverse coded for this reliability and normality analysis so that they would align with scoring on factors relevant to the Social Cognitive Career scale discussed above, thus high scores should be interpreted as minimal barriers.

Across the **full scale for Educational Barriers**, initial reliability was found to be **excellent** as measured by Cronbach's alpha (α = .921) (see Appendix Q – Table 3)**.** The summary of item means (M=4.65) suggests items cluster very slightly towards the upper end of the scale (desired mean for a 7-point scale = 4.0) (see Appendix Q – Table 4).

Further, the average standard deviation across the full scale (SD=1.953) falls above the minimum standard deviation threshold for a 7-point scale (SD=1.5), suggesting there is adequate variability of scores about the mean. The mean of Inter-Item Correlations (.375) suggests that correlation between some items within the scale may not be strong, though this is not unexpected, as the subscales within this full scale are intended to measure different underlying constructs. All Cronbach's alpha if deleted scores fall below the Cronbach's alpha for the full scale.

Principal Components Analysis

To determine if underlying constructs were present in the Educational Barriers scale, a principal components analysis was conducted with a direct oblimin rotation. Initially, a principal components analysis was conducted on the 24 items included in the Educational Barriers scale, without rotation, using an Eigenvalues > 1.0 threshold (see Appendix Q – Table 1) as well as a review of the corresponding scree plot (see Appendix Q – Figure 1) to determine how many values to retain based upon the location of the "elbow" in the plot. From review of Bartlett's test of sphericity ($p < .000$), it was determined that it was reasonable to proceed with the principal components analysis. There were five factors for which Eigenvalues > 1.0, which explained 60.9% of the total variance.

Appendix Q – Table 1

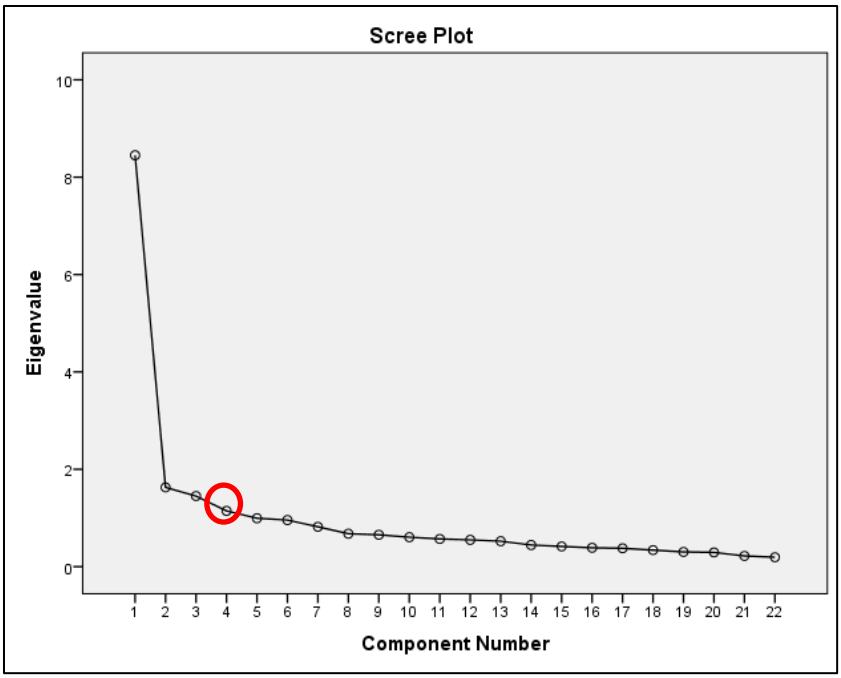
Principal Components Analysis: Initial # of Components with Eigenvalues > 1.0 – Not Rotated

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings[a]
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total
1	8.763	38.099	38.099	8.763	38.099	38.099	5.993
2	1.631	7.091	45.189	1.631	7.091	45.189	4.153
3	1.452	6.312	51.501	1.452	6.312	51.501	5.836
4	1.150	5.001	56.503	1.150	5.001	56.503	4.606
5	1.015	4.415	60.917	1.015	4.415	60.917	1.324
6	.993	4.319	65.236				
7	.829	3.605	68.841				
8	.707	3.075	71.916				
9	.668	2.906	74.822				
10	.654	2.843	77.665				
11	.589	2.563	80.228				
12	.566	2.459	82.686				
13	.522	2.269	84.956				
14	.510	2.217	87.173				
15	.445	1.935	89.108				
16	.415	1.803	90.911				
17	.383	1.664	92.575				
18	.365	1.589	94.164				
19	.340	1.476	95.640				
20	.300	1.305	96.946				
21	.292	1.269	98.215				
22	.219	.952	99.167				
23	.192	.833	100.000				

Extraction Method: Principal Component Analysis.

a. When components are correlated, sums of squared loadings cannot be added to obtain a total variance.



Appendix Q – Figure 1. Scree Plot to Determine Number of Factors to Retain

Review of the scree plot, however, proved ambiguous, as it was difficult to ascertain whether four or five factors should be retained. The principal components analysis was retained using five factors without rotation. However, the ending result was a complex structure with many items loading on multiple factors and only 1 item loading on the fifth factor within an acceptable limit ($r \geq .40$). In an effort to approach a more simple structure among factors, the analysis was rerun retaining only four factors and using an oblimin rotation since it was suspected that some items were correlated with each other. Retaining only four factors explained 56.53% of the total variance among scores.

Upon review of the factor loadings achieved when retaining only four factors with oblimin rotation, it was determined that a simple structure was achieved (see Appendix Q

– Table 2); 22 items loaded on a single factor, though two items did not load on any factor (#27.13 and 28.31). These two items, as well as items #28.15 and 28.19, were removed from further analysis, as it was determined that the wording of the questions may have been unclear to participants. Additionally, item #28.18 (Other) was removed, as it did not load on any factor, nor did it sensibly fit with the quantitative analysis. The remaining 19 items were reviewed in accordance with the identified four factors and factor labels were assigned: (1) Support from Others, (2) Financial Related Issues, (3) Academic Readiness, and (4) Social Belonging and Mental Health.

Appendix Q – Table 2

Factor Solution – Retaining 4 factors with Oblimin Rotation

Pattern Matrix[a]

	Component			
	1	2	3	4
A27_1_REV_Money	-.097	.877	.103	.082
A27_2_REV_FamProb	.093	.502	.247	-.113
A27_3_REV_NotSmart	-.038	.088	.791	-.075
A27_4_REV_NegFam	.529	.215	.121	.176
A27_5_REV_NotFittingIn	.389	-.074	.226	-.348
A27_6_REV_ProfSupport	.541	-.025	.316	-.020
A27_7_REV_NotPrepared	.053	-.011	.818	-.086
A27_8_REV_StudyWell	.027	-.029	.858	-.037
A27_10_REV_Lonely	.155	-.010	.207	-.668
A27_11_REV_MentalHlth	-.020	.180	.165	-.642
A27_12_REV_StaffSupport	.624	.051	.179	.014
A27_13_REV_AcadProbation	.437	.011	.361	.280
A28_11_REV_FriendSupport	.671	.053	.064	-.023
A28_12_REV_NegGender	.727	.029	-.213	-.263
A28_13_REV_NegRace	.780	.010	-.145	-.098
A28_14_REV_Relationship	.264	.072	.013	-.593
A28_15_REV_Work	-.049	.725	-.155	-.130
A28_16_REV_LackRoleModel	.592	.112	.089	-.127
A28_17_REV_LackFin	.236	.727	-.006	.103
A28_19_REV_DifStudEmploy	.325	.367	.013	-.085
A28_20_REV_TimeMgmt	-.119	.201	.489	-.367
A28_30_REV_LackMotiv	.212	.128	.475	-.166
A28_31_REV_Uncer_Major	.270	-.010	.261	-.263

Extraction Method: Principal Component Analysis.

Rotation Method: Oblimin with Kaiser Normalization.

a. Rotation converged in 16 iterations.

Subscale Reliability

Reliability analyses were conducted on the modified full scale (eliminated 5 items from the original scale) for measures related to Educational Barriers as well as on each of the four subscales (Support from Others, Financial Related Issues, Academic Readiness, and Social Belonging and Mental Health) (see Table 4). Across the **full scale** of 19 items, reliability was found to be very good as measured by Cronbach's alpha (α = .919). The summary of item means (Mean=4.65) suggests items cluster towards the center of the scale as is to be expected of a distribution approaching normality (desired mean for a 7-point scale = 4.0). Further, the average standard deviation across the full scale (SD=1.954) falls above the minimum standard deviation threshold for a 7-point scale (SD=1.5), suggesting there is adequate variability of scores about the mean. The mean of inter-Item correlations for the full scale (Mean = .379) suggests that correlation between some items within the scale, though positive, may not be strong.

To assess whether the items identified to comprise the four newly identified subconstructs of the Educational Barriers scale formed reliable subscales, Cronbach's alpha, Corrected Item Total Correlations, Cronbach's alpha if Deleted, and Mean of Inter-Item Correlations were reviewed (see Appendix Q – Table 3). Corrected item total correlations for all items in each subscale fell above the minimum desired threshold ($r \geq$ .40) suggesting the items forming each subscale "hang together" adequately. Cronbach's alpha if deleted scores for all items in each subscale fell below the identified Cronbach's alpha for each subscale. The means of Inter-Item correlations for each of the subscales exceeded the minimum threshold ($r \geq .40$) with the exception of the full scale, for which

the mean of inter-item correlations was *r=0.379.* This is not of particular concern, however, as each of the subscales measure different factors.

Appendix Q – Table 3

Educational Barriers Scale: Reliability of Factor Sub-Scales and Items Summary Table

Scale	# Items	Cronbach's Alpha (α)	Corrected Item Total Correlations (desired $r \geq .40$)	Cronbach's Alpha if deleted (desired < α)	Mean of Inter-Item Corr.(r)
Educational Barriers Scale	19	0.921	--	--	0.379
Support from Others	7	0.847	All $r \geq 0.40$	All < 0.847	0.441
Financial Issues	3	0.744	All $r \geq 0.40$	All < 0.744	0.493
Academic Readiness	5	0.860	All $r \geq 0.40$	All < 0.860	0.551
Soc Belong & Mntl Hlth	4	0.789	All $r \geq 0.40$	All < 0.789	0.482

Review of Item Means and Standard Deviations

While the overall **mean of item means** ($\bar{X} = 4.65$) and **mean standard deviation** (SD= 1.95) for the full scale and within each subscale suggest values fall only slightly above the center of the scale and have adequate variability about the mean, analyses were conducted at the item level to assess if any items require further review. As illustrated in Appendix Q – Table 4, item means in the Support from Others subscale fell slightly above the desired threshold (M = 4.0 ± .50), suggesting a slight negative skew. The majority of items in the other subscales fell very near 4.0 with the exception of item #27.1 (Money Problems) and item #28.20 (Difficulty Managing Time) in the Academic

Readiness subscale, suggesting values for these items may cluster towards the lower end of the scale across participants. The standard deviations across all items was above the minimum desired threshold (>1.5), suggesting adequate variability about the mean.

Appendix Q – Table 4

Educational Barriers Scale - Subscale Item Means and Standard Deviations

Scale/Item	Mean (desired M = 4.0)	Std. Dev. (desired SD > 1.5)
Full Scale	4.65	1.953
Support from Others	5.39*	1.807
27.4	5.93*	1.712
27.6	4.96*	1.826
27.12	5.06*	1.840
28.11	5.56*	1.732
28.12	5.52*	1.812
28.13	5.63*	1.821
28.16	5.05*	1.903
Finan. Issues	4.07	2.083
27.1	3.30*	2.057
27.2	4.49	2.034
28.17	4.42	2.155
Academic Readiness	4.04	1.977
27.3	4.24	2.016
27.7	4.08	1.940
27.8	4.07	2.010
28.20	3.25*	1.905
28.30	4.56	2.010
Soc. Bel./Mntl Hlth	4.45	2.103
27.5	4.95	2.007
27.10	4.20	2.140
27.11	4.27	2.229
28.14	4.41	2.028

*Value falls outside of desired threshold.

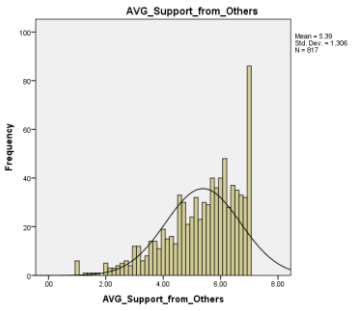
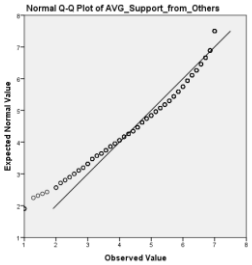
Review of Subscale Normality

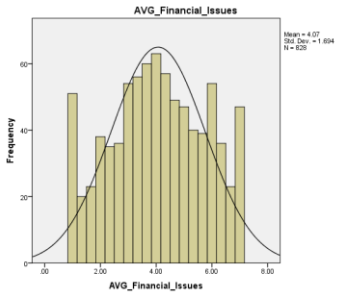
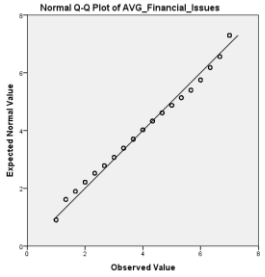
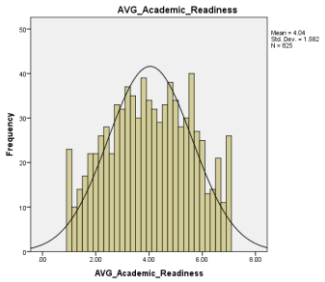
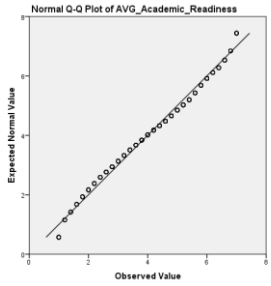
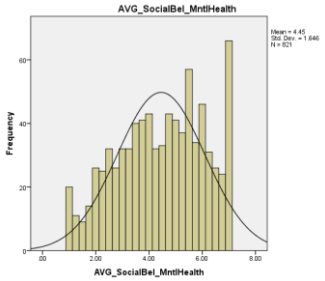
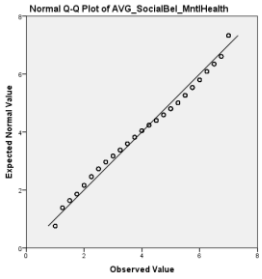
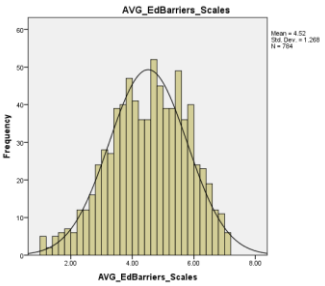
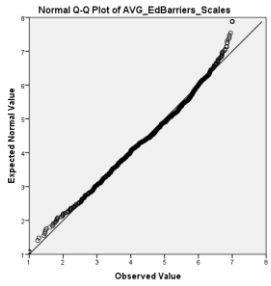
The four subscales of the Educational Barriers scale were further assessed for normality by averaging the item scores within each subscale and reviewing the skew, kurtosis, and percentile rankings (see Appendix Q – Table 5). Additionally, the four subscale average scores were averaged to create a new Educational Barriers overall average score. Histograms and Q-Q plots were also created to aid with visual interpretation of the data

Appendix Q – Table 5

Educational Barriers Scale - Statistical Review of Sub-Scale Normality

Scale	Skew (Desired < $\pm$1.0)	Kurtosis (Desired < $\pm$3.0)	50th Percentile (expected $\bar{X}$ = 4.0)	75th Percentile (expected $\bar{X}$ = 5.25)
Support from Others	-0.870	.348	5.714	6.429
Finan. Issues	-0.059	-0.903	4.000	5.333
Academic Readiness	-0.024	-.0888	4.000	5.400
Soc. Bel./Mntl Hlth	-0.221	-0.905	4.500	5.750
Avg of 4 Ed Barriers	-0.272	-0.417	4.615	5.495

	Histogram	Q-Q Plot
Support from Others		

Financial Related Issues		
Academic Readiness		
Social Belonging/Mental Health		
Average of 4 Educational Barriers Subscales		

Findings suggest all subscales and the overall scale had minimal skew and kurtosis, as all values fell within the desired ranges of desirability (Skew < ± 1.0 and

Kurtosis < ± 3.0). Upon review of percentile rankings, all values fell very near the desired ranges (50^{th} percentile 4.0 ± 0.5 on a 7 point scale; 75^{th} percentile 5.25 ± 0.5), with the exception the Support from Others subscale, for which values clustered towards the upper end of the scale across participants. Visual review of the histograms and Q-Q plots further affirms a slight deviation from normality for the Support from Others subscale, while all other scales appeared to approach normality.

Conclusions of Reliability Analysis of Expectancy-Value Library Motivation Scale and Subscales

Overall, the findings of this reliability analysis suggest the four subscales comprising the Educational Barriers Scale (1) Support from Others, (2) Financial Related Issues, (3) Academic Readiness, and (4) Social Belonging and Mental Health have respectable to very good reliability based upon statistical findings for Cronbach's alpha scores, Cronbach's alpha if deleted scores, and corrected item-total correlations. Further review of descriptive statistics, including scale and item means, standard deviations, skew, kurtosis, and percentile rankings suggest data are largely distributed as expected across the scale, with a slight diversion from normality for the Support from Others subscale, which has a slightly greater than average cluster of scores at the upper end of the scale. The strong reliability of these four subscales further affirms the decision based upon the Principal Components Factors Analysis findings to analyze the data within the realm of these four factors. Analysis of the full scale further revealed that the scale has excellent reliability when the four items initially included in the assessment were removed (28.15, 28.18, 28.19, and 28.31) due to misfit with the other items in the scale and/or poor wording. Based upon analysis of normality of the combined average score for

Educational Barriers, the findings suggest the distribution approaches normality, has negligible skew, kurtosis, and values fall as desired for both the 50^{th} and 75^{th} percentiles.

APPENDIX R

UNDERGRADUATE STUDENT INFORMATION SEEKING INTERVIEW PROTOCOL: POST-SURVEY

RQ2: What are the social cognitive information needs of successful students?

1. Tell me a little bit about your educational background before you enrolled at this university. (Other college, high school)

2. How would you describe your previous success as a student? How about now?

3. When you started as a student here, did you feel that you were adequately prepared for college level coursework?

    - How about living independently – away from home?
    - Are there any things that the university could have done to help you feel more prepared?

4. Tell me a little bit about why you chose your major?

5. How confident are you that your major will help you get a job that you really like after you graduate?

6. How would you describe your confidence in your abilities to be academically successful here at this university?

    - How important is it to you to graduate from this university as opposed to another university?

7. During the course of an average week, what are some of most common types of information you find yourself looking for to answer questions in your everyday life? (Hours for a restaurant, movie times, health information, financial info, etc.).

8. What have been some of the **major stressors** you've encountered while a student at this university? (time management, challenges making friends, keeping up with coursework, financial stressors, support from home, loneliness, confidence)

    - Can you think of anything that might help students be successful?

9. Do you know of any students who have dropped out of the university or who are thinking of dropping out?
    - Why do you think this is?
    - Can you think of anything that might have helped them stay in school?

RQ3: How do undergraduate students prefer to meet their information needs?

10. In general, when you are looking to answer questions that arise during the course of your daily life, **how do you go about finding answers**?
    - How about for course related research?
    - Do you find that you take a different approach for everyday life and course related information seeking?

11. What are your most common "go to **sources**" for information for **everyday life** questions?
    - How about for course-related research?
    - Why do you tend to choose this/these resources over others?

12. What types of technology do you own? (smartphone, tablet, pc, laptop)

13. In a typical week, what **technology tools**, if any, do you typically use to find answers to questions that come up in your **everyday life**?
    - What **tools** do you typically use for your **course-related research**?
    - Why do you choose this/these types of technology over others?

Dependent Variable (Library Utilization)

14. Have you used the library since you've been a student here at the university?

15. Have you participated in a class or workshop about how to use the library resources? For example, has a librarian come to one of your classes or did you go as a class to the library – where the librarian showed you how to the resources such as databases? (How many classes have you attended?)

16. How would you describe the frequency of your library use? (Never, 1-2 times/semester, 1-2 times/month, 1-2 times/week, almost daily, multiple times/day)

17. When you say you have used the library, tell me more about this.
    - In person or online?

- What did you do when you were using the library? (study, look for books, use computers, access library databases or online catalog, group study, attend meetings or events)

18. Have you used the library's online resources such as the library website, online databases, online catalog, or research guides to complete homework assignments or to do research for a paper?

    - How about for non-course related research?

RQ1: What motivational variables best predict library utilization by undergraduate students?

19. When you have used the library in the past to find information for one of your course assignments, how would you describe your **success** in finding what you needed?

20. The next time you need to use the library's online resources such as databases or the library catalog, how **confident** are you that you will be able to find what you need?

21. When you have visited the library (in person or online), what has **prompted you to do so**?
    - What did you do on those occasions when you visited the library?

22. Did you feel that using the online library resources was **worthwhile** to you? Why is this?

23. In general, how would you compare your experiences in looking up something for a course assignment using the library versus using Google? (time, effort, success, satisfaction)

24. A lot of undergraduate students tend to avoid using the library in favor of easier sources such as Google. Why do you think this is?

25. What are some things that might motivate students to use the library's online resources? Ask further probing questions as necessary.

RQ4: To what extent is addressing the everyday life information needs of students a viable option for academic libraries?

26. Libraries are interested in understanding more about the everyday information needs of students. What are your thoughts as far as what the library could offer that could be relevant and useful to you?

27. If the library had easily accessible information to campus resources and other information to help students to address everyday life things (e.g., financial issues, career information, academic preparation skills, confidence, health/wellness, ways to connect with other students on campus, information about childcare for students with children, information security such as privacy or fraud…) do you think students would use it? Why do you think so?
    - How important do you think this type of information is for students on a daily basis (place to eat, checking for career)?

Ask interviewees to email me their mailing address for an Amazon gift card.

APPENDIX S

LIBRARY WEBSITE FEATURE ANALYSIS CHECKLIST

1. University ID

2. Geographic Location
    - West
    - Southwest
    - Midwest
    - Southeast
    - Northeast

3. Hyperlink to Library Website

Library Searching (Academic)

4. ONE SEARCH BOX: Is there a single search box that can search the university's online catalog and online databases simultaneously with a single click? Typing in the term "juvenile diabetes" provides a list of results that includes print books and journal articles (at a minimum)
    - Yes
    - No
    - Other: _____

5. Is there a link to Google Scholar directly on the library's homepage?
    - Yes
    - No
    - Other: _____

6. Is there a link to Google Scholar from the library's database list?
    - Yes
    - No
    - Other: _____

7. EASY ACCESS TO FULL TEXT: In the Article Search Box from the library homepage (if available), typing in the name of journal article, "Toward a Psychology of Human Agency" by A. Bandura (2006), Perspectives on Psychological Science, Vol. 1, Issue 2 provides a link to full text version of the article.
    - Yes
    - No
    - Other: _____

8. NATURAL LANGUAGE: Does typing in the question "How is the Internet affecting our brains?" in the **library catalog** search box yield meaningful results that might be relevant and useful for an undergraduate level research paper?
    - Yes
    - No
    - Other: _____

9. NATURAL LANGUAGE: Does typing in the question "How is the Internet affecting our brains?" in the **library's multi-resource search** (if available) yield results that may be relevant and useful for an undergraduate level research paper?
    - Yes
    - No
    - N/A
    - Other: _____

10. PRE-SELECTED MATERIALS FOR COURSES: Is there a research guide for an entry level Communications course such as COM 101 or ENG 101?
    - Yes
    - No
    - Other: _____

11. PRE-SELECTED MATERIAL FOR MAJORS/SUBJECTS: Is there a subject/major specific research guide for Psychology?
    - Yes
    - No
    - Other: _____

12. CUSTOMIZABLE: Does the library website offer an option for students to login and create a personalized portal for information? (e.g., LibGuides for the courses they are taking.)
    - Yes
    - No
    - Other: _____

13. Comments relating to the Library Searching (Academic):
    _____

Library Online Support Services for Students

14. CHAT: Does the library offer online chat support?
    - Yes
    - No
    - Other: _____

15. EASY ACCESS TO CHAT: Is there a link to chat support directly from the library's homepage?
    - Yes
    - No
    - Other: _____

16. PERSONAL LIBRARIAN: Does each student on the campus have a personal librarian?
    - Yes
    - No
    - Other: _____

17. PERSONAL LIBRARIAN LOOK-UP: Is there a Personal Librarian search feature or directory that is accessible from the library homepage or one level below?
    - Yes
    - No
    - Other: _____

18. SUBJECT LIBRARIAN: Is there a subject librarian for the major subjects offered at the university?
    - Yes
    - No
    - Other: _____

19. SUBJECT LIBRARIAN LOOK-UP: Is there a Subject Librarian search feature or directory that is accessible from the library homepage or one level below?
    - Yes
    - No
    - Other: _____

20. Comments relating to the Library Online Support Services for Students:
    _____

Mobile Access to the Library

21. LIBRARY MOBILE APP: Is there a mobile app for the university library available for download on a smartphone through the Apple "App" Store?
    - Yes
    - No
    - Other: _____

22. LIBRARY MOBILE WEBSITE: Does the library have a mobile optimized version of their website?

- Yes
- No
- Other: _____

23. Comments relating to Mobile Access to Library: _____

Everyday Life Information Seeking at the Library

24. CAMPUS SERVICES INFO AT LIBRARY: Does the library have a directory and/or information about the student services available on campus available from the library homepage or one level below that includes details about services are offered?
    - Yes
    - No
    - Other: _____

25. NEWS/CURRENT EVENTS: Is there a Newspaper/Current Events Research Guide?
    - Yes
    - No
    - Other: _____

26. Is there a link to a Newspaper on the library's homepage?
    - Yes
    - No
    - Other: _____

27. NEWSPAPER DATABASE: Does the library provide access to a Newspaper database?
    - Yes
    - No
    - Other: _____

28. NEWSPAPER DATABASE - IDENTIFIED: If the library provides access to a Newspaper database, please list those that have been identified:
    _____

29. Comments relating to Everyday Life Information Seeking at the Library:
    _____

Everyday Life Tools

(Available via the library homepage via direct link from homepage or one level below homepage)

30. INDEPENDENT LIVING: Does the library offer a tool or specific information to help students transition to independent living?
    - Yes
    - No
    - Other: _____

31. INDEPENDENT LIVING TOOLS - IDENTIFIED: Please list any tools or specific information the library has available to help students transition to independent living. _____

32. TIME MANAGEMENT: Does the library offer a tool or specific information to help students manage their time?
    - Yes
    - No
    - Other: _____

33. TIME MANAGEMENT TOOLS IDENTIFIED: Please list any tools or specific information the library has available to help students with time management. _____

34. ACADEMIC/STUDY SKILL BUILDING: Does the library offer a tool or specific information to help students develop their academic study skills?
    - Yes
    - No
    - Other: _____

35. ACADEMIC/STUDY SKILL TOOL IDENTIFIED: Please list any tools or specific information the library has available to help students develop their academic/study skills. _____

36. FINANCIAL LITERACY/FINANCIAL INFORMATION: Does the library offer a tool or specific information to help students become financially literate or learn to manage their money?
    - Yes
    - No
    - Other: _____

37. FINANCIAL TOOLS - IDENTIFIED: Please list any tools or specific information the library has available to help students become financially literate or learn to manage their money. _____

38. CAREER/JOB TOOLS: Does the library offer a tool or specific information to help students explore different careers or jobs?
    - Yes
    - No
    - Other: _____

39. CAREER/JOB TOOLS: Please list any tools or specific information the library has available to help students explore careers or jobs.
    _____

40. CAREER DATABASE: Does the library offer a Careers/Jobs database to help students explore information about careers or jobs?
    - Yes
    - No
    - Other: _____

41. CAREER DATABASE - IDENTIFIED: If the library provides a career database(s), please list those that were identified. _____

42. HEALTH/WELLNESS INFORMATION: Does the library offer a tool, specific information, and/or a database that students can use to look up information about their health (for the layperson - rather than a scientific database for health professions researchers)?
    - Yes
    - No
    - Other: _____

43. HEALTH/WELLNESS - IDENTIFIED: If the library provides access to specific information, tools, or a layperson database for students to look-up information about their health, please list. _____

44. STAYING CONNECTED - HOME: Does the library website provide a tool(s) or information that will help a student to connect with people at home?
    - Yes
    - No
    - Other: _____

45. STAYING CONNECTED - CAMPUS: Does the library website provide a tool or specific information that will help a student connect to others on campus?

- Yes
- No
- Other: _____

46. STAYING CONNECTED TOOL(S): If the library provides tools or information to help students connect with others (home or on-campus), please list.
    _____

47. Comments related to Everyday Life Tools at the Library:
    _____

APPENDIX T

UNDERGRADUATE STUDENTS' INFORMATION SEEKING NEEDS AND PREFERENCES: POTENTIAL LIBRARY SERVICES, TOOLS, AND FEATURES

*Phase II Survey Questions #13 & 14: "Given your current information needs, please rate the **LIKELIHOOD** that you would **actually use** the following potential library services, tools, or features, if they were offered by your university."*

Item from Phase II Survey (#13 & 14)	Librarian Inter.	Reten/ Enroll Inter.	Student Survey	Student Inter.
Library Searching (Academic)				
One search box for everything I need (13_1) Operational Definition: Is there a single search box that can search the university's online catalog and online databases simultaneously with a single click? *Typing in the term "juvenile diabetes" provides a list of results that includes print books and journal articles (minimum)*			Quantitative (M=5.48)	
Capability to search the library and Google (or other search engines) at the same time (13_2) Operational Definition: Is there a search feature (or link) available from the library homepage that will pull up information available from the library and Google at the same time?			Quantitative (M=5.45)	

Item from Phase II Survey (#13 & 14)	Librarian Inter.	Reten/ Enroll Inter.	Student Survey	Student Inter.
Easy Access to Full Text Articles (13_4) Operational Definition: In the Article Search Box from the library homepage (if available), typing in the name of journal article, “Toward a Psychology of Human Agency" by A. Bandura (2006), Perspectives on Psychological Science, Vol. 1, Issue 2 provides a link to full text version of the article .			Quantitative (M=5.95)	
Capability to just type in what I’m looking for without working about special searching language or strategies (13_8) Operational Definition: Does typing in the question “How is the Internet affecting our brains?” in the library catalog search box yield meaningful results?			Quantitative (M=5.48)	
Pre-Selected Materials (such as a Research Guide) for **Courses** (13_5) Operational Definition: Is there a research guide for an entry level Communications course such as COM 101?			Quantitative (M=5.58)	
Pre-Selected Materials (such as a Research Guide) for **Major** or **Subject** (13_5) Operational Definition: Is there a subject/major specific research guide for Psychology?			-- See above	

Item from Phase II Survey (#13 & 14)	Librarian Inter.	Reten/ Enroll Inter.	Student Survey	Student Inter.
Customizable website so I can have easy access to all my favorite information sources. (13_6) Operational Definition: Does the library website offer an option to login, develop a profile, and customize information?			Quantitative (M=4.96)	
Library Online Support Services for Students				
24/7 Online chat support (13_3) Operational Definition: Does the library offer 24/7 online chat support?			Quantitative (M=4.31)	
Chat Support Link on Library Homepage? Operational Definition: Is there a link to chat support directly from the library's homepage?			-- See above	
Personal librarian to contact for questions (13_7) Operational Definition: Does each student on the campus have a personal librarian?			Quantitative (M=4.17)	
Personal librarian look-up Operational Definition: Is there a Personal Librarian search feature or directory that is accessible from the library homepage or one level below?			-- See above	

Item from Phase II Survey (#13 & 14)	Librarian Inter.	Reten/ Enroll Inter.	Student Survey	Student Inter.
Subject librarian to contact for questions related to my major or the subject I am studying? (related to 13_7) Operational Definition: Is there a subject librarian for the major subjects offered at the university?			Quantitative (M=4.17 for Personal Librarian)	
Subject librarian search or directory Operational Definition: Is there a Subject Librarian search feature or directory accessible from the library homepage or one level below?			-- See above	
Mobile Access to the Library				
Mobile library app for smartphones and tablets (13_10) Operational Definition: Is there a mobile app for the university library available for download on a smartphone through the Apple "App" Store?			X (M=4.67)	
Mobile Library Website (13_9) Operational Definition: Is there a mobile library website that is accessible via a smartphone?			X (M=4.90)	
Everyday Life Information Seeking				
Info about campus services (e.g., counseling, financial, etc.) (14_11) Operational Definition: Does the library have a directory and/or information about the student services available on campus via the library homepage or one level below that including details about services are offered?	X	X	Quantitative (M=4.72)	

Item from Phase II Survey (#13 & 14)	Librarian Inter.	Reten/ Enroll Inter.	Student Survey	Student Inter.
Easy access to news and current events info (14_16) Operational Definition: Is there a link to news and/or current events from the library homepage or one level below?			Quantitative (M=4.90)	X
Everyday Life Tools (available via the library homepage via direct link from homepage or one level below homepage) *Does the library provide tools or specific information to support student with the following?*				
Independent living skills tools or information Operational Definition: Does the library offer a tool or specific information to help students transition to independent living?	X	X	Qualitative Comment(s)	
Time management tools or information (Listed under question regarding Potential Barriers" Operational Definition: Does the library offer a tool or specific information to help students manage their time?	X	X	Quantitative (M=3.74)	X
Academic and study skills building tools or Information (14_20) Operational Definition: Does the library offer a tool or specific information to help students develop their academic study skills?	X	X	Quantitative (M=4.98)	X

Item from Phase II Survey (#13 & 14)	Librarian Inter.	Reten/ Enroll Inter.	Student Survey	Student Inter.
Financial literacy/financial information tools or information (14_18) Operational Definition: Does the library offer a tool or specific information to help students become financially literate?	X	X	Quantitative (M=4.67)	X
Career/Job tools or info (14_15) Operational Definition: Does the library offer a tool or specific information to help students explore information about careers or jobs?	X	X	Quantitative (M=5.47)	
Career/Job database Operational Definition: Does the library offer a database that provides information about careers?			-- See above	
Health and wellness tools or information (14_14) Operational Definition: Does the library offer a tool or specific information to help students manage their health and wellness?			Quantitative (M=4.45)	
Stay connected with people at home – Tools (14_13) Operational Definition: Does the library website provide a tool(s) or information that will help a student to connect with people at home?			Quantitative (M=3.88)	

Item from Phase II Survey (#13 & 14)	Librarian Inter.	Reten/ Enroll Inter.	Student Survey	Student Inter.
Connecting with others on campus – Tools or (14_12) Operational Definition: Does the library website provide a tool or specific information that will help a student connect to others on campus?	X	X	Quantitative (M=4.36)	X

APPENDIX U

MEMBER CHECKING – SAMPLE EMAIL TO UNDERGRADUATE STUDENTS

Dear (Name of Participant):

Thank you for your participation earlier this Spring in a one-on-one interview with me as part of my dissertation research relating to undergraduate students' information seeking needs, preferences, and motivation. As part of this study, I have collected data at three large public universities including interviews with academic librarians (n=8), university retention officials (n=3), **undergraduate students (n=18)**, and an online undergraduate survey (n=1278).

A **bulleted summary list of my key findings** from the student interviews is provided below. A more comprehensive summary report of my findings from these interviews is also attached. Would you be willing to **scan the list** below and **let me know if you concur** with these findings? If not, I welcome your further input or clarifications.

Motivation to Use the Library

1. Undergraduate students find Google to be more convenient and easier to use than online library resources (n=12).
2. Undergraduate students' use of online library resources is primarily driven by course assignment requirements and professor expectations (n=9)
3. Some students gravitate towards the library's online library resources for course related research because they value the quality and credibility of these resources over what can be found online through Google (n=7).
4. The physical library is primarily used by students as a place for quiet and/or collaborative study (n=9).
5. The library is valued by many students as a place to access computers and technology (n=4).
6. Students have been successful in past attempts at searching online library materials for course assignments (n=10).
7. Students expect to be successful the next time they use the library's online resources. (n=15).

Social Cognitive Information Needs of Undergraduate Students

1. Students need (or want) information:
   a. To help them complete their course assignments (n=6).
   b. About how to find and navigate campus resources and services (n=6).
   c. About news and current events (n=7).

2. Common educational barriers for undergraduate student success include:
   a. "Lack of Academic Readiness" (n=12).

b. "Poor Time Management" (n=10)
c. "Being Underprepared for Living Independently" (n=6)
d. "Financial Issues" (n=5)
e. For some students, college is a "poor fit" (n=5).
f. "Need for more in-depth advising" (n=4).
g. "Difficulty developing a sense of belonging" (n=4)

3. Undergraduate students are:
   a. Confident that they will be academically successful at their universities (n=16).
   b. Confident that they will find satisfying work in their fields after graduation (n=8).
   c. Split nearly 50/50 with respect to their commitment to graduating from their particular universities (Committed n=6/Not Committed n=7).

Undergraduate Student Information Seeking Preferences

1. Google is the preferred information source for Everyday Life Information Seeking (n=16).
2. Google is a preferred information source for Academic Information Seeking (n=7).
3. Online Library Resources are important sources for Academic Information Seeking (n=8).
4. Course materials such as textbooks and articles provided by the instructor are popular sources for Academic Information Seeking (n=5).
5. A smartphone is the most preferred technology tool for Everyday Life Information Seeking (n=9).
6. A laptop is the most preferred technology tool for Academic Information Seeking (n=16).

Feasibility of Revised Library Model as Campus Information Hub

1. Students feel that they would use and value the academic library as a place to address the everyday life information needs that are important to undergraduate students. (n=14).

NOTE: This exercise, called Member Checking, is a qualitative research validation technique to help improve the validity or accuracy of a study. In this approach, the investigator takes summaries of the findings back to key participants in the study and asks them whether the findings are an accurate reflection of their experiences. (Creswell and Plano Clark, 2011, Designing and Conducting Mixed Methods Research, p. 211).

Thank you for your time and consideration.
Becky